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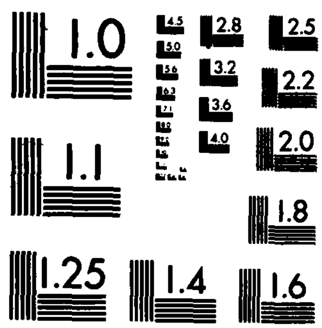
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AGARD-AR-138-ADDENDUM





AGARD-AR-138-ADDENDUM

# AGARD

ADVISORY GROUP FOR AEROSPACE RESEARCH & DEVELOPMENT

7 RUE ANCELLE 92200 NEUILLY SUR SEINE FRANCE

AGARD ADVISORY REPORT No.138

# Fluid Dynamics Panel Working Group 04 on Experimental Data Base for Computers Program Assessment

## Addendum



NORTH ATLANTIC TREATY ORGANIZATION

DISTRIBUTION AND AVAILABILITY ON BACK COVER

AGARD-AR138-Addendum

NORTH ATLANTIC TREATY ORGANIZATION

ADVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT

(ORGANISATION DU TRAITE DE L'ATLANTIQUE NORD)

ADDENDUM TO

AGARD Advisory Report No.138

# EXPERIMENTAL DATA BASE FOR COMPUTERS PROGRAM ASSESSMENT

## REPORT OF THE FLUID DYNAMICS PANEL WORKING GROUP 04



This Advisory Report was prepared at the request of the AGARD Fluid Dynamics Panel.

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Published July 1984



ISBN 92-835-1475-0

*Set and Printed by Specialised Printing Services Limited*
*40 Chigwell Lane, Loughton, Essex IG10 3TZ*

## PREFACE

The data collected in this Addendum complement those included in the AGARD Advisory Report No.AR-138 issued in May 1979. In that report certain recommendations were made with regard to further, more rigorous test cases. At the time the AGARD Fluid Dynamics Panel instructed the TES (Technique d'Essais en Soufflerie) committee to pay heed to those recommendations and take action, when a suitable experimental data base became available. A number of 3-D test cases that closely match these recommendations have since then appeared and the TES committee has felt obliged to follow up on its own recommendations and make these data available to the AGARD community.

Regarding further 2-D test cases, no test has yet appeared that matches the recommendations for the "ideal" test case given in AR-138. However, considerable effort is still being expended in many NATO countries towards the perfection of the 2-D test methodology (e.g. US., Canada and the Garteur group in Europe). The TES-committee will stay à jour with these developments and, if and when warranted, follow up with appropriate action.

Concerning body-alone configurations, it was recommended in AR-138 that the data given for the ONERA calibration body C5 (case C4 in AR-138) should be complemented with boundary layer survey data. This would result in virtually the ideal test case for bodies of revolution at zero angle of attack. However no such data have so far been produced.

L.H.OHMAN
*Chairman*
Fluid Dynamics Panel
Committee on Windtunnel & Testing
Techniques

## CONTENTS

## INTRODUCTION

by

L.H.Ohman
National Aeronautical Establishment
National Research Council
Ottawa, Ontario K1A OR6

The presented data originate from three different sources, the Lockheed-Georgia Co., USA., the Aircraft Research Association (ARA), Bedford, England and the Aeronautical Research Institute of Sweden (FFA).

The two Lockheed-Georgia supplied data sets are for a high and a low aspect ratio wing in wing-alone configuration. The investigation, from which these data are extracted, was specifically designed to provide data for computer program assessment, so that wing geometries are quite simple, although based on supercritical airfoil technology. The data were obtained in the Lockheed-Georgia 0.508m x 0.712m Compressible Flow Windtunnel, using reflection plane (half-model) technique, with special attention paid to the thinning of the reflection plane boundary layer. Furthermore, extensive wall boundary pressure data were obtained and are included in the data sets, allowing for the evaluation of wall interference effects.

The ARA data are for a high aspect ratio swept wing and a low aspect ratio swept wing wing-body combination tested in the ARA 9ft x 8ft transonic windtunnel. The wing geometries are rather complicated, requiring a large number of airfoil sections (modern, but not supercritical) for proper definition. The data are corrected for wall interference.

The FFA-supplied data were obtained in free flight with a low aspect ratio swept wing aircraft of simple wing geometry. The flight test was specifically designed for obtaining interference-free aerodynamic data of high quality at realistic Reynolds numbers. The accuracy and repeatability of these data are comparable with those of the above windtunnel test data.

The data are presented in the same format as in the main body of AR-138, with the data sets designated B-6 to B-10. The 3-D cases in AR-138 were given the designation B-1 to B-5. A brief summary of the geometric characteristics and test conditions for the five cases are provided below. The reader/user should be aware of the fact that the data included here represent a selection only of data from rather comprehensive investigations, the extent of which is given under respective headings.

Suitable contacts and addresses are included in the data sets, should further information be required.

| *Data Set* | *Config.* | *Leading Edge Sweep* | *Aspect Ratio* | *Taper Ratio* | *No. & Type of Airfoil Sections* | *Mach No. Range* | *Angle of Attack Range* | *RN Range Based on M.A.C.* | *Comments* |
|---|---|---|---|---|---|---|---|---|---|
| B-6 | Semi-span wing | 27° | 8 | 0.4 | 2 supercritical t/c = 0.12 | 0.62-0.84 | −2° to +5° | 6 x 10$^6$ | Wall boundary pressure data incl. |
| B-7 | Semi-span wing | 35° | 3.8 | 0.4 | 2 supercritical t/c = 0.06 | | | 10 x 10$^6$ | Wall boundary pressure data incl. |
| B-8 | Wing/body full model | 40° inboard 34.4° outboard | 9 | 0.25 | 10 advanced t/c = 0.14 - 0.105 - 0.11 | 0.50-0.93 | −4° to +3° | 3.5 x 10$^6$ | Corrected for wall int. |
| B-9 | Wing/body full model | 40° | 4 | 0.25 | 10 advanced t/c = 0.105 - 0.07 | 0.5-0.82 | 0° to + 8° | 2.8-3.7 x10$^6$ | Corrected for wall int. |
| B-10 | Aircraft | 38.9° | 4.519 | 0.335 | 1 'classic' t/c = 0.10 | 0.4-0.89 | 0° to +10° | 10 - 30 x 10$^6$ | Free flight |

# 6. TRANSONIC WING AND FAR FIELD TEST DATA ON A HIGH ASPECT RATIO TRANSPORT WING FOR THREE DIMENSIONAL COMPUTATIONAL METHOD EVALUATION.

BY

K.P. BURDGES AND B.L. HINSON
LOCKHEED-GEORGIA COMPANY
86 SOUTH COBB DRIVE
MARIETTA, GEORGIA 30063

## 6.1 INTRODUCTION

The data presented in this contribution were obtained in the Lockheed-Georgia Compressible Flow Wind Tunnel as part of a research program sponsored by the United States Air Force Office of Scientific Research. The intent of the experiment was to provide force and pressure data on a state-of-the-art supercritical moderate aspect ratio transport wing for evaluation of three-dimensional flow computation methods. The wing, though simply defined, is representative of high performance supercritical technology. The pressure distributions on this wing exhibit recompression of the local supersonic flow over the front part of the wing, terminating the supersonic region with a moderate strength, swept shock wave. The strength of the shock wave increases with free stream Mach number until a small region of trailing edge separation occurs in the 70% semispan pressure data for M = .84. The latter condition is an interesting test case for viscous modeling techniques.

In the past, there has been some lack of understanding as to the far field boundary conditions in wind tunnel experiments, e.g. porous walls. The accuracy of current computational methods has caused concern over the influence of small differences between far field boundary conditions of wind tunnel experiments and the free air boundary condition applied at the edge of the mathematical computational zone. In an effort to improve the rigor of the code evaluation, a far field boundary condition was measured in the experiment to be included as a boundary condition when evaluating computational methods.

Experimental longitudinal static pressure distributions near the wind tunnel walls were measured at 4 spanwise positions, above and below the model. These measurements are included in the data set. Other measurements, such as the effect of wall porosity and empty tunnel pressure distributions were obtained, but are not appropriate in this data set. All data presented are not corrected for any wind tunnel wall interference.

A simple body was included in the original test program to provide wing/body interference effects as well. These data are not included in this data set, but are available on magnetic tape through the United States Air Force Office of Scientific Research, Bolling Air Force Base, D.C.

## 6.2 DATA SET

1. General Description

| | | |
|---|---|---|
| 1.1 | Model Designation or Name | LOCKHEED - AFOSR Wing A |
| 1.2 | Model Type (e.g., Full Span Wing-Body, Semi-Span Wing) | Semi Span Wing. (Wing-body data in Reference Report) |
| 1.3 | Design Requirement/Conditions | This model was designed to provide state-of-the-art transonic performance characteristics, but with a simple geometry suitable for ease of input into theoretical math models. |
| 1.4 | Additional Remarks | Extensive far field boundary condition measurements were made to provide a rigorous test case for theoretical models and eliminate uncertainties about wind tunnel wall effects. |

2. Model Geometry

2.1 Wing Data

| | | |
|---|---|---|
| 2.1.1 | Wing Planform | Simple, swept back, tapered - See Figure 6.1. |
| 2.1.2 | Aspect Ratio | 8.0 |
| 2.1.3 | Quarter Chord Sweep | 25.0° |

| | | |
|---|---|---|
| 2.1.4 | Trailing Edge Sweep | 14.6° |
| 2.1.5 | Taper Ratio | 0.4 |
| 2.1.6 | Twist | 4.8° |
| 2.1.7 | Mean Aerodynamic Chord | 12.26 cm (4.825 in) |
| 2.1.8 | Span or Semispan | 45.7 cm (18.0 in) Semispan |
| 2.1.9 | Number of Airfoil Sections Used to Define Wing | Two, t/c = .12 Supercritical |
| 2.1.10 | Spanwise Location of Reference Section and Section Coordinates (Note if Ordinates are Design or Actual Measured Values) | y/b = 0, 1.0<br>Design Coordinates in Table I |
| 2.1.11 | Lofting Procedure Between Reference Sections | Straight Line |
| 2.1.12 | Form of Wing-Body Fillet, Strakes | None |
| 2.1.13 | Form of Wing Tip | Airfoil thickness form rotated about camber line |
| 2.2 | Body Data (Detail Description of Body Geometry) | See Figure 6.2. |
| 2.3 | Wing-Body Combination | |
| 2.3.1 | Relative Body Diameter (Average Body Diameter at Wing Location Divided by Wing Span) | .097 |
| 2.3.2 | Relative Vertical Location of Wing (Height Above or Below Axis Divided by Average Body Radius at Wing Location) | Three Positions: high, medium, low - Wing. See Reference Report. |
| 2.3.3 | Wing Setting Angle | 2.76° |
| 2.3.4 | Dihedral | 0.0° |
| 2.4 | Cross Sectional Area Development | See Figure 6.3. |
| 2.5 | Fabrication Tolerances/Waviness | ± .05 mm |

3. <u>Wind Tunnel</u>

| | | |
|---|---|---|
| 3.1 | Designation | Lockheed-Georgia Compressible Flow Wind Tunnel |
| 3.2 | Type of Tunnel | |
| 3.2.1 | Continuous or Blowdown Indicate Minimum Run Time if Applicable | Blow down<br>12 sec (Max. = 120 sec) |
| 3.2.2 | Stagnation Pressure | 19 - 172 dynes/cm$^2$ (20-175 psia) |
| 3.2.3 | Stagnation Temperature | 266 - 311 K (480 - 560° R) |
| 3.3 | Test Section | |
| 3.3.1 | Shape of Test Section | Rectangular |
| 3.3.2 | Size of Test Section (Width, Height, Length) | 50.8 cm (20.0 in) x 71.2 cm (28.0 in) x 183 cm (72.0 in) |

| | | |
|---|---|---|
| 3.3.3 | Type of Test Section Walls Closed, Open, Slotted, Perforated | Solid at model centerline (floor of tunnel). Perforated with 60° inclined holes. |
| | Open Area Ratio (Give Range if Variable) | 0 ~ 10% |
| | Slot/Hole Geometry (e.g., 30-Degree Slanted Holes) | 60° slanted holes in two sliding plates. |
| | Treatment of Side Wall Boundary Layer | |
| | Full Span Model | No treatment |
| | Half-model testing | Floor boundary layer removed (model centerline) 53.6 cm (21.0 in) ahead of balance centerline. |
| 3.4 | Flow Field (Empty Test Section) | |
| 3.4.1 | Reference Static Pressure | Wall static upstream of porous section |
| 3.4.2 | Flow Angularity | 0 |
| 3.4.3 | Mach Number Distribution | Shown in Ref. Rept. |
| 3.4.4 | Pressure Gradient | Shown in Ref. Rept. |
| 3.4.5 | Turbulence/Noise Level | Not measured |
| 3.5 | Freestream Mach Number (or Velocity) | |
| 3.5.1 | Range | 0.2 to 1.1 |
| 3.5.2 | Pressure Used to Determine Mach Number (e.g., Settling Chamber Total Pressure and Plenum Chamber Pressure) | Settling chamber total pressure and wall static pressure. |
| 3.5.3 | Accuracy of Mach Number Determination ($\Delta M$) | .002 |
| 3.5.4 | Maximum Mach Number Variation During a Run | .005 |
| 3.6 | Reynolds Number Range | |
| 3.6.1 | Unit Reynolds Number Range (Give Range at Representative Mach Numbers; 1/m) | 15 to 150 million per meter |
| 3.6.2 | Means of Varying Reynolds Number (e.g., by Pressurization) | Pressurization |
| 3.7 | Temperature Range and Dewpoint, Can Temperature be Controlled? | Temp not controlled<br>Dewpoint = 222 K<br>(400°R) |
| 3.8 | Model Attitudes | |
| 3.8.1 | Angle-of-Attack | Constant during run |
| 3.8.2 | Accuracy in Determining Angles | 0.05 Deg. |
| 3.9 | Organization Operating the Tunnel and Location of Tunnel | Lockheed-Georgia Co. |
| 3.10 | Who is to be Contacted for Additional Information | K. P. Burdges<br>Dept. 72-74, Zone 403<br>Lockheed-Georgia Co.<br>Marietta, Ga. 30063 USA |

| | |
|---|---|
| 3.11 Literature Concerning this Facility | G. A. Pounds and Stanewsky, E., "The Compressible Flow Facility, Part 1: Design" Lockheed GA. Co. ER 9219-1, Oct. 1967. |
| 3.12 Additional Remarks | |

4. **Tests**

| | |
|---|---|
| 4.1 Type of Tests | Transonic force and pressure |
| 4.2 Wing Span or Semispan to Tunnel Width | .67 |
| 4.3 Test Conditions | |
| 4.3.1 Angle-of-Attack | -2.0 to 5.0 Degrees |
| 4.3.2 Mach Number | 0.62 to 0.84 |
| 4.3.3 Dynamic Pressure | 14.4 dynes/$cm^2$ (14.6 psia) |
| 4.3.4 Reynolds Number | 6 Million based on MAC |
| 4.3.5 Stagnation Temperature | 289 K (520°R) |
| 4.4 Transition | |
| 4.4.1 Free or Fixed | Fixed |
| 4.4.2 Position of Free Transition | |
| 4.4.3 Position of Fixed Transition, Width of Strips, Size and Type of Roughness Elements | 1.2 mm (.05 in) wide strip of glass beads 0.058 mm (0.0023 in) dia located .05 MAC from LE |
| 4.4.4 Were Checks Made to Determine if Transition Occurred at Trip Locations? | No |
| 4.5 Bending or Torsion Under Load | |
| 4.5.1 Describe Any Aero-elastic Measurements Made During Tests | None |
| 4.5.2 Describe Results of Any Bench Calibrations | None |
| 4.6 Were Different Sized Models Used in Wind-Tunnel Investigation? If so, Indicate Sizes | No |
| 4.7 Areas and Length Used to Form Coefficients | Wing Area - 528 $cm^2$ (81.8 $in^2$)<br>Mean Aerodynamic Chord - 12.26 cm (4.825 in)<br>Wing Semispan - 45.7 cm (18.0 in) |
| 4.8 References on Tests | Hinson, B. L. and Burdges, K. P., "Acquisition and Application of Transonic Wing and Far-Field Test Data for Three-Dimensional Computational Method Evaluation," AFOSR-TR-80-0421, March 1980. |
| 4.9 Additional Remarks | Ratio of model solid blockage area to test section cross-sectional area:<br>Wing - .018<br>Wing with body - .027 |

5. **Instrumentation**

| | |
|---|---|
| 5.1 Surface Pressure Measurements | |

| | |
|---|---|
| 5.1.1 Pressure Orifices in Wing. Location and Number on Upper and Lower Surfaces | 110 upper surface, 50 lower surface, measured positions in Table II. |
| 5.1.2 Pressure Orifices on Fuselage. Location and Number | None |
| 5.1.3 Pressure Orifices on Components, Give Component and Orifice Location | None |
| 5.1.4 Geometry of Orifices | Normal to surface, .5 mm (.020 in) dia. |
| 5.1.5 Type of Pressure Transducer and Scanning Devices Used. Indicate Range and Accuracy | Statham 12.5 psid transducers<br>Scanivalve Model J2<br>$\pm$0.5% Full Scale |
| 5.2 Force Measurements | |
| 5.2.1 Type and Location of Balance | 5 component floor balance (semi-span) |
| 5.2.2 Forces and Moments that Can be Measured. Maximum Loads and Accuracy | Normal Force: 3.34 kN; ±0.25%<br>Axial Force: 334 N; ±0.25%<br>Pitching Moment: 203 m-N; ±0.25%<br>Rolling Moment: 678 m-N; ±0.25%<br>Yawing Moment: 68 m-N; ±0.25% |
| 5.2.3 Forces and Moments on Components | None |
| Type and Location of Balance | |
| Maximum Loads and Accuracy | |
| 6. Data | |
| 6.1 Accuracy | |
| 6.1.1 Pressure Coefficients | ±.002 |
| 6.1.2 Aerodynamic Coefficients | $\pm$ .002 on $C_P$, $\pm$ .001 on $C_L$,<br>$\pm$ .0003 on $C_D$, $\pm$ .0007 on $C_M$ |
| 6.1.3 Boundary Layer and Wake Quantities | |
| 6.1.4 Repeatability | Note duplicate symbols on force data. Figure 6.5 - 6.7 |
| 6.1.5 Additional Remarks | |
| 6.2 Wall Interference Corrections | Not applied, but static pressure measured at 4 spanwise locations near the tunnel walls above and below the model to provide far-field boundary conditions for code correlations. (See Figures 6.4, 6.12 and Table III, V - VIII.) |
| 6.3 Data Presentation | |
| 6.3.1 Aerodynamic Coefficients | See Figure 6.5 - 6.7 |
| 6.3.2 Surface Pressure Coefficients | See Figure 6.8 - 6.11, Table V, VI, VII, and VIII |
| 6.3.3 Flow Conditions | See Table IV |
| - Aerodynamic coefficient data | M = .62, .72, .76, .78, .80, .82, .84<br>$\alpha$ = -2 to 3° |

| | | |
|---|---|---|
| | - Pressure data | <u>Wing Pressures</u><br>M = .62, .80, .82, .84 at $\alpha = 3°$<br><u>Wind-Tunnel Wall Pressures</u><br>M = .62, .80, .82, .84 at $\alpha = 3°$ |
| 6.3.4 | Boundary Layer and/or Wake Data | None |
| 6.3.5 | Flow Conditions for Boundary Layer and/or Wake Data | None |
| 6.3.6 | Wall Interference Corrections Included? | No |
| 6.3.7 | Aeroelastic Corrections Included? | No |
| 6.3.8 | Other Corrections? | No |

## 7. References


1. Hinson, B. L., and Burdges, K. P., "Acquisition and Application of Transonic Wing and Far-Field Test Data for Three-Dimensional Computational Method Evaluation," AFOSR-TR-80-0421, March 1980.

2. Pounds, G. A., and Stanewsky, E., "The Compressible Flow Facility, Part 1: Design," Lockheed-Georgia Company ER 9219-1, October 1967.


## 8. List of Symbols

| | |
|---|---|
| AR | wing aspect ratio, $b^2/S$ |
| b | wing span |
| C | streamwise local chord of wing |
| $C_D$ | drag coefficient |
| $C_L$ | lift coefficient |
| $C_M$ | pitching-moment coefficient about quarter chord of MAC |
| $C_p$ | pressure coefficient |
| M | freestream Mach number |
| MAC | mean aerodynamic chord of wing |
| $R_N$ | Reynolds number based on freestream conditions and MAC |
| S | wing planform area |
| x | streamwise coordinate measured from wing leading edge |
| y | spanwise coordinate measured from plane of symmetry |
| $z$ | Coordinate Normal to Airfoil Chord or Tunnel Center Plane |
| $\alpha$ | angle of wing reference plane relative to tunnel axis |
| $\theta$ | wing section local incidence angle relative to WRP |
| $\lambda$ | wing taper ratio, $C_t/C_r$ |
| $\Lambda$ | wing sweep angle |
| $\eta$ | span station, y/(b/2), ETA |
| $\tau$ | wind tunnel wall porosity |

Subscripts:

| | |
|---|---|
| L | lower surface |
| LE | leading edge |
| M | measured |
| r,R | wing root |
| t | wing tip |
| TE | trailing edge |
| U | upper surface |

Abbreviations:

| | |
|---|---|
| CFWT | Lockheed Compressible Flow Wind Tunnel |
| WRP | wing reference plane |

TABLE I - WING A DESIGN ORDINATES

| | ROOT SECTION | | TIP SECTION | |
|---|---|---|---|---|
| X/C | $Z_U/C$ | $Z_L/C$ | $Z_U/C$ | $Z_L/C$ |
| .00000 | .00000 | .00000 | .00000 | .00000 |
| .00241 | .00952 | -.00800 | .00788 | -.00899 |
| .00961 | .01758 | -.01578 | .01697 | -.01588 |
| .02153 | .02431 | -.02205 | .02557 | -.02141 |
| .03806 | .03018 | -.02822 | .03305 | -.02589 |
| .05904 | .03496 | -.03432 | .03984 | -.02964 |
| .08427 | .03857 | -.04055 | .04610 | -.03320 |
| .11349 | .04136 | -.04684 | .05172 | -.03659 |
| .14645 | .04364 | -.05309 | .05658 | -.03990 |
| .18280 | .04554 | -.05889 | .06067 | -.04296 |
| .22221 | .04704 | -.06391 | .06401 | -.04562 |
| .26430 | .04807 | -.06772 | .06665 | -.04775 |
| .30866 | .04864 | -.07031 | .06859 | -.04922 |
| .35486 | .04874 | -.07126 | .06983 | -.04992 |
| .40245 | .04835 | -.07094 | .07036 | -.04964 |
| .45099 | .04736 | -.06882 | .07021 | -.04802 |
| .50000 | .04574 | -.06540 | .06943 | -.04460 |
| .54901 | .04345 | -.06008 | .06799 | -.03923 |
| .59755 | .04062 | -.05349 | .06591 | -.03238 |
| .64514 | .03726 | -.04548 | .06311 | -.02478 |
| .69134 | .03353 | -.03695 | .05956 | -.01710 |
| .73570 | .02958 | -.02838 | .05504 | -.00997 |
| .77779 | .02554 | -.02034 | .04948 | -.00381 |
| .81720 | .02153 | -.01323 | .04295 | .00099 |
| .85355 | .01767 | -.00734 | .03585 | .00423 |
| .88651 | .01410 | -.00283 | .02874 | .00596 |
| .91573 | .01087 | .00016 | .02206 | .00617 |
| .94096 | .00806 | .00168 | .01618 | .00522 |
| .96194 | .00574 | .00195 | .01134 | .00357 |
| .97847 | .00382 | .00142 | .00745 | .00155 |
| .99039 | .00237 | .00048 | .00481 | -.00003 |
| .99759 | .00124 | -.00043 | .00285 | -.00146 |
| 1.00000 | .00080 | -.00080 | .00207 | -.00207 |

TABLE II - PRESSURE ORIFICE MEASURED LOCATIONS

| | UPPER SURFACE | | | | |
|---|---|---|---|---|---|
| ETA | .15 | .3 | .5 | .7 | .95 |
| X/C | .0193 | .0180 | .0185 | .0175 | .0196 |
| | .0480 | .0467 | .0459 | .0514 | .0480 |
| | .0975 | .0968 | .0975 | .0958 | .0929 |
| | .1471 | .1474 | .1479 | .1463 | .1440 |
| | .1967 | .1971 | .1956 | .1964 | .1930 |
| | .2478 | .2465 | .2458 | .2442 | .2434 |
| | .2982 | .2963 | .2962 | .2956 | .2959 |
| | .3471 | .3463 | .3461 | .3465 | .3438 |
| | .3981 | .3971 | .3752 | .3955 | .3940 |
| | .4465 | .4465 | .4466 | .4438 | .4426 |
| | .4970 | .4777 | .4965 | .4952 | .4948 |
| | .5475 | .5468 | .5459 | .5451 | .5419 |
| | .5972 | .5965 | .5972 | .5940 | .5945 |
| | .6467 | .6463 | .6468 | .6442 | .6442 |
| | .6769 | .6965 | .6956 | .6946 | .6930 |
| | .7471 | .7475 | .7455 | .7444 | .7437 |
| | .7981 | .7963 | .7965 | .7944 | .7941 |
| | .8478 | .8464 | .8458 | .8450 | .8417 |
| | .8984 | .8967 | .8960 | .8951 | .8930 |
| | .9490 | .9467 | .9458 | .9449 | .9416 |
| | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| | LOWER SURFACE | | | | |
| | .0471 | .0470 | .0453 | .0440 | .0472 |
| | .0976 | .0989 | .0948 | .0965 | .0946 |
| | .1976 | .1975 | .1954 | .1949 | .1954 |
| | .2974 | .2962 | .2952 | .2931 | .2954 |
| | .3970 | .3968 | .3952 | .3938 | .3967 |
| | .4973 | .4964 | .4952 | .4942 | .4952 |
| | .5972 | .5948 | .5955 | .5951 | .5968 |
| | .6976 | .6921 | .6954 | .6964 | .6973 |
| | .7967 | .7964 | .7953 | .7961 | .7912 |
| | .8983 | .8985 | .8979 | .9014 | .9017 |
| | .9472 | .9497 | .9522 | .9476 | .9201 |
| | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

TABLE III - LOCATIONS OF FAR FIELD PRESSURE ORIFICE

| $Z/C_R$ <br> $Y/C_R$ | 1.231 <br> 0.0 | -1.231 <br> 0.0 | 1.423 <br> .923 | 1.423 <br> 1.990 | 1.423 <br> 3.029 | -1.423 <br> .856 | -1.423 <br> 1.990 | -1.423 <br> 3.019 |
|---|---|---|---|---|---|---|---|---|
| | $X/C_R$ | $X/C_R$ | $X/C_R$ | $X/C_R$ | $X/C_R$ | $X/C_R$ | $X/C_R$ | $X/C_R$ |
| | -2.850 | -2.850 | -2.839 | -2.839 | -2.839 | -2.839 | -2.839 | -2.839 |
| | -2.712 | -2.712 | -2.378 | -2.378 | -2.378 | -2.378 | -2.378 | -2.378 |
| | -2.191 | -2.191 | -1.917 | -1.917 | -1.917 | -1.917 | -1.917 | -1.917 |
| | -1.148 | -1.148 | -1.455 | -1.455 | -1.455 | -1.455 | -1.455 | -1.455 |
| | -0.451 | -0.451 | -1.301 | -1.301 | -1.301 | -1.301 | -1.301 | -1.301 |
| | -0.106 | -0.106 | -1.148 | -1.148 | -1.148 | -1.148 | -1.148 | -1.148 |
| | +0.240 | +0.240 | -0.994 | -0.994 | -0.994 | -0.994 | -0.994 | -0.994 |
| | 0.586 | 0.586 | -0.840 | -0.840 | -0.840 | -0.840 | -0.840 | -0.840 |
| | 0.934 | 0.934 | -0.686 | -0.686 | -0.686 | -0.686 | -0.686 | -0.686 |
| | 1.281 | 1.281 | -0.532 | -0.532 | -0.532 | -0.532 | -0.532 | -0.532 |
| | 1.627 | 1.627 | -0.378 | -0.378 | -0.378 | -0.378 | -0.378 | -0.378 |
| | 2.324 | 2.324 | -0.225 | -0.225 | -0.225 | -0.225 | -0.225 | -0.225 |
| | 3.017 | 3.017 | -0.071 | -0.071 | -0.071 | -0.071 | -0.071 | -0.071 |
| | 3.712 | 3.712 | +0.083 | +0.083 | +0.083 | +0.083 | +0.083 | +0.083 |
| | | | 0.237 | 0.237 | 0.237 | 0.237 | 0.237 | 0.237 |
| | | | 0.390 | 0.390 | 0.390 | 0.390 | 0.390 | 0.390 |
| | | | 0.544 | 0.544 | 0.544 | 0.544 | 0.544 | 0.544 |
| | | | 0.698 | 0.698 | 0.698 | 0.698 | 0.698 | 0.698 |
| | | | 0.852 | 0.852 | 0.852 | 0.852 | 0.852 | 0.852 |
| | | | 1.006 | 1.006 | 1.006 | 1.006 | 1.006 | 1.006 |
| | | | 1.159 | 1.159 | 1.159 | 1.159 | 1.159 | 1.159 |
| | | | 1.313 | 1.313 | 1.313 | 1.313 | 1.313 | 1.313 |
| | | | 1.467 | 1.467 | 1.467 | 1.467 | 1.467 | 1.467 |
| | | | 1.621 | 1.621 | 1.621 | 1.621 | 1.621 | 1.621 |
| | | | 1.775 | 1.775 | 1.775 | 1.775 | 1.775 | 1.775 |
| | | | 1.928 | 1.928 | 1.928 | 1.928 | 1.928 | 1.928 |
| | | | 2.082 | 2.082 | 2.082 | 2.082 | 2.082 | 2.082 |
| | | | 2.236 | 2.236 | 2.236 | 2.236 | 2.236 | 2.236 |
| | | | 2.697 | 2.697 | 2.697 | 2.697 | 2.697 | 2.697 |
| | | | 3.159 | 3.159 | 3.159 | 3.159 | 3.159 | 3.159 |
| | | | 3.620 | 3.620 | 3.620 | 3.620 | 3.620 | 3.620 |

TABLE IV - SUMMARY OF TEST CONDITIONS

| $\alpha$ \ M | .62 | .72 | .76 | .78 | .80 | .82 | .84 | | |
|---|---|---|---|---|---|---|---|---|---|
| -2 | ○℧⊖Ω <br> □◇△ | ○ | ○ | ○ | ○℧⊖Ω | ○℧⊖Ω <br> □◇△ | ○ | | |
| -1 | ○℧⊖Ω <br> □◇△ | ○ | ○ | ○ | ○℧⊖Ω | ○℧⊖Ω <br> □◇△ | ○ | | |
| 0 | ○℧⊖Ω <br> □◇△ | ○ | ○ | ○ | ○℧⊖Ω <br> △ | ○℧⊖Ω <br> □◇△ | ○ | | |
| 1 | ○℧⊖Ω <br> □◇△ | ○ | ○ | ○ | ○℧⊖Ω <br> △ | ○℧⊖Ω <br> □◇△ | ○ | | |
| 2 | ○℧⊖Ω <br> □◇△ | ○℧⊖Ω <br> □◇ | ○℧⊖Ω <br> □◇ | ○℧⊖Ω <br> □◇ | ○℧⊖Ω <br> □◇△ | ○℧⊖Ω <br> □◇△ | ○℧⊖Ω <br> □◇ | | |
| 3 | ○℧⊖Ω <br> □◇△ | ○ | ○ | ○ | ○℧⊖Ω | ○℧⊖Ω <br> □◇△ | ○ | | |
| 4 | ○℧⊖Ω <br> □◇△ | ○ | ○ | | | ○ | | | |
| 5 | ○℧⊖Ω <br> □◇△ | | | | | | | | |
| | | | | | | | | | |
| $C_L$ = .45 | ○ <br> □◇△ | | | | ○ | ○ <br> □◇△ | | | |

○ CLEAN WING, $\tau$ = 4%

□ CLEAN WING, $\tau$ = 3%

◇ CLEAN WING, $\tau$ = 5%

△ CLEAN WING, $\tau$ = 6%

℧ HIGH WING, $\tau$ = 4%

⊖ MID WING, $\tau$ = 4%

Ω LOW WING $\tau$ = 4%

# TABLE V - TABLE OF MEASURED PRESSURE COEFFICIENTS, M = .62

RUN 18 MACH .6217 ALPHA 2.976 REN 6.03 $C_L$ .41279 $C_D$ .02318 $C_M$ -.04172

## WING PRESSURE DATA

| STA .15 | | .30 | | .5 | | .7 | | .95 | |
|---|---|---|---|---|---|---|---|---|---|
| $c_l$ .41279 | | .44446 | | .48228 | | .48056 | | .33109 | |
| $c_m$ -.02660 | | -.03295 | | -.04228 | | -.05403 | | -.05708 | |
| X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ |
| | | | | UPPER SURFACE | | | | | |
| .0193 | -1.4986 | .0180 | -1.5763 | .0185 | -1.4618 | .0175 | -1.1639 | .0196 | -.5579 |
| .0480 | -1.4270 | .0467 | -1.3004 | .0459 | -1.5415 | .0514 | -1.2694 | .0480 | -.7175 |
| .0975 | -.8560 | .0968 | -.9695 | .0975 | -.9724 | .0958 | -.9262 | .0929 | -.5334 |
| .1471 | -.6823 | .1474 | -.7301 | .1479 | -.7645 | .1463 | -.7699 | .1440 | -.6194 |
| .1967 | -.5833 | .1971 | -.6351 | .1956 | -.6683 | .1964 | -.6684 | .1930 | -.5643 |
| .2478 | -.5358 | .2465 | -.5723 | .2458 | -.6004 | .2442 | -.6085 | .2434 | -.5136 |
| .2982 | -.4955 | .2963 | -.5274 | .2962 | -.5466 | .2956 | -.5557 | .2959 | -.4731 |
| .3471 | -.4713 | .3463 | -.4928 | .3461 | -.5085 | .3465 | -.5225 | .3438 | -.4367 |
| .3981 | -.4457 | .3971 | -.4608 | .3752 | -.4886 | .3955 | -.4913 | .3940 | -.4188 |
| .4465 | -.4473 | .4465 | -.4390 | .4466 | -.4517 | .4438 | -.4512 | .4426 | -.3801 |
| .4970 | -.3825 | .4777 | -.3885 | .4965 | -.4178 | .4952 | -.4327 | .4948 | -.3623 |
| .5475 | -.3486 | .5468 | -.3569 | .5459 | -.3859 | .5451 | -.4140 | .5419 | -.3497 |
| .5972 | -.3109 | .5965 | -.3308 | .5972 | -.3513 | .5940 | -.3841 | .5945 | -.3318 |
| .6467 | -.2792 | .6463 | -.2949 | .6468 | -.3275 | .6442 | -.3599 | .6442 | -.3305 |
| .6769 | -.2427 | .6965 | -.2535 | .6956 | -.2891 | .6946 | -.3290 | .6930 | -.3231 |
| .7471 | -.1883 | .7475 | -.2043 | .7455 | -.2415 | .7444 | -.2827 | .7437 | -.2963 |
| .7981 | -.1392 | .7963 | -.1485 | .7965 | -.1848 | .7944 | -.2111 | .7941 | -.2163 |
| .8478 | -.0844 | .8464 | -.0901 | .8458 | -.1077 | .8450 | -.1095 | .8417 | -.1289 |
| .8984 | -.0279 | .8967 | -.0301 | .8960 | -.0482 | .8951 | -.0732 | .8930 | -.0296 |
| .9490 | .0435 | .9467 | .0398 | .9458 | .0368 | .9449 | .0280 | .9416 | .0475 |
| 1.0000 | .0037 | 1.0000 | .0217 | 1.0000 | .0664 | 1.0000 | .0908 | 1.0000 | .0962 |
| | | | | LOWER SURFACE | | | | | |
| .0471 | .3391 | .0470 | .3407 | .0453 | .3161 | .0440 | .2681 | .0472 | -.0045 |
| .0976 | .1692 | .0989 | .1560 | .0948 | .1480 | .0965 | .1202 | .0946 | -.0146 |
| .1976 | -.0752 | .1975 | -.0640 | .1954 | -.0436 | .1949 | -.0634 | .1954 | -.1441 |
| .2974 | -.2273 | .2962 | -.1954 | .2952 | -.2051 | .2931 | -.1717 | .2954 | -.2188 |
| .3970 | -.2574 | .3968 | -.2351 | .3952 | -.2391 | .3938 | -.2164 | .3967 | -.2343 |
| .4973 | -.2490 | .4964 | -.2330 | .4952 | -.2168 | .4942 | -.1972 | .4952 | -.2275 |
| .5972 | -.1495 | .5948 | -.1522 | .5955 | -.1050 | .5951 | -.0954 | .5968 | -.0906 |
| .6976 | .0197 | .6921 | .0319 | .6954 | .0762 | .6964 | .0864 | .6973 | .0809 |
| .7967 | .1692 | .7964 | .1918 | .7953 | .2057 | .7961 | .2128 | .7912 | .1952 |
| .8983 | .2720 | .8985 | .2888 | .8979 | .2896 | .9014 | .2922 | .9017 | .2590 |
| .9472 | .2834 | .9497 | .2978 | .9522 | .2854 | .9476 | .2833 | .9201 | .2701 |
| 1.0000 | .0037 | 1.0000 | .0217 | 1.0000 | .0664 | 1.0000 | .0908 | 1.0000 | .0962 |

## FAR FIELD MEASUREMENT

| $Z/C_R$ | 1.231 | -1.231 |
|---|---|---|
| $Y/C_R$ | 0.0 | 0.0 |
| $X/C_R$ | $C_p$ | $C_p$ |
| -2.850 | | .0564 |
| -2.712 | -.0186 | .0314 |
| -2.191 | .0072 | .0248 |
| -1.148 | .0166 | -.0032 |
| -0.451 | .0324 | -.0033 |
| -0.106 | .0368 | -.0286 |
| +0.240 | .0342 | -.0488 |
| 0.586 | .0171 | -.0816 |
| 0.934 | .0243 | -.0755 |
| 1.281 | .0165 | -.0071 |
| 1.627 | .0314 | -.0647 |
| 2.324 | .0136 | -.0492 |
| 3.017 | -.0137 | -.0507 |
| 3.712 | -.0788 | -.0607 |

| $Z/C_R$ | 1.423 | 1.423 | 1.423 | -1.423 | -1.423 | -1.423 |
|---|---|---|---|---|---|---|
| $Y/C_R$ | .923 | 1.990 | 3.029 | .856 | 1.990 | 3.019 |
| $X/C_R$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ |
| -2.839 | -.0097 | .0018 | .0195 | .0187 | .0174 | .0216 |
| -2.378 | .0055 | .0126 | .0114 | .0031 | .0137 | .0173 |
| -1.917 | .0008 | .0093 | .0144 | .0097 | .0085 | .0186 |
| -1.455 | .0068 | .0061 | .0182 | .0123 | .0095 | .0167 |
| -1.301 | .0081 | .0087 | .0127 | .0135 | .0021 | .0147 |
| -1.148 | -.0021 | .0127 | .0148 | .0132 | .0120 | .0176 |
| -0.994 | .0015 | .0101 | .0118 | .0183 | .0093 | .0124 |
| -0.840 | .0029 | .0072 | .0074 | .0177 | .0085 | .0159 |
| -0.686 | .0037 | .0064 | .0096 | .0209 | .0117 | .0151 |
| -0.532 | -.0034 | .0037 | .0092 | .0242 | .0134 | .0136 |
| -0.378 | -.0038 | -.0039 | .0043 | .0217 | .0126 | .0108 |
| -0.225 | -.0062 | -.0034 | .0027 | .0343 | .0164 | .0128 |
| -0.071 | -.0251 | -.0046 | .0039 | .0251 | .0169 | .0176 |
| +0.083 | -.0255 | -.0094 | .0026 | .0360 | .0192 | .0171 |
| 0.237 | -.0304 | -.0188 | -.0002 | .0336 | .0184 | .0188 |
| 0.390 | -.0376 | .0046 | -.0027 | .0349 | .0409 | .0171 |
| 0.544 | -.0490 | -.0097 | -.0052 | .0394 | .0373 | .0193 |
| 0.698 | -.0542 | -.0123 | -.0060 | .0401 | .0422 | .0198 |
| 0.852 | -.0569 | -.0183 | -.0074 | .0359 | .0447 | .0212 |
| 1.006 | -.0591 | -.0259 | -.0098 | .0313 | .0443 | .0235 |
| 1.159 | -.0607 | -.0291 | -.0116 | .0411 | .0426 | .0217 |
| 1.313 | -.0606 | -.0333 | -.0178 | .0315 | .0398 | .0237 |
| 1.467 | -.0550 | -.0359 | -.0169 | .0227 | .0379 | .0220 |
| 1.621 | -.0515 | -.0351 | -.0133 | .0229 | .0319 | .0214 |
| 1.775 | -.0470 | -.0339 | -.0119 | .0346 | .0329 | .0231 |
| 1.928 | -.0130 | -.0365 | -.0149 | .0293 | .0259 | .0221 |
| 2.082 | -.0224 | -.0357 | -.0107 | .0276 | .0208 | .0249 |
| 2.236 | -.0356 | -.0373 | -.0092 | .0193 | .0218 | .0224 |
| 2.697 | -.0356 | -.0316 | -.0098 | .0067 | .0099 | .0216 |
| 3.159 | -.0354 | -.0253 | .0038 | -.0124 | .0017 | .0237 |
| 3.620 | -.0348 | -.0253 | .0009 | -.0250 | [illegible] | [illegible] |

## TABLE VI - TABLE OF MEASURED PRESSURE COEFFICIENTS, M = .80

RUN 92 MACH .8009 ALPHA 2.941 REN 6.11 $C_L$ .53581 $C_D$ .03556 $C_M$ -.05270

WING PRESSURE DATA

| STA | .15 | | .30 | | .5 | | .7 | | .95 | |
|---|---|---|---|---|---|---|---|---|---|---|
| $c_l$ | .48576 | | .53396 | | .56957 | | .57607 | | .38178 | |
| $c_m$ | -.03632 | | -.02907 | | -.03954 | | -.05203 | | -.05021 | |
| | X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ |
| UPPER SURFACE | | | | | | | | | | |
| | .0193 | -.8298 | .0180 | -.8460 | .0185 | -.7557 | .0175 | -.6019 | .0196 | -.3790 |
| | .0480 | -1.1767 | .0467 | -1.1726 | .0459 | -1.1674 | .0514 | -1.0921 | .0480 | -.7400 |
| | .0975 | -1.2542 | .0968 | -1.2952 | .0975 | -1.2295 | .0958 | -1.1360 | .0929 | -.6562 |
| | .1471 | -1.1771 | .1474 | -1.2291 | .1479 | -1.2209 | .1463 | -1.1724 | .1440 | -.9203 |
| | .1967 | -.6797 | .1971 | -1.1964 | .1956 | -1.2045 | .1964 | -1.1494 | .1930 | -.9794 |
| | .2478 | -.6945 | .2465 | -1.1745 | .2458 | -1.1878 | .2442 | -1.1439 | .2434 | -.9899 |
| | .2982 | -.6713 | .2963 | -1.1321 | .2962 | -1.1759 | .2956 | -1.1328 | .2959 | -1.0249 |
| | .3471 | -.6783 | .3463 | -.7377 | .3461 | -1.1505 | .3465 | -1.1287 | .3438 | -.5318 |
| | .3981 | -.6641 | .3971 | -.5372 | .3752 | -.6727 | .3955 | -.8080 | .3940 | -.3455 |
| | .4465 | -.6775 | .4465 | -.4568 | .4466 | -.6116 | .4438 | -.6155 | .4426 | -.3149 |
| | .4970 | -.6809 | .4777 | -.4040 | .4965 | -.4817 | .4952 | -.4859 | .4948 | -.3060 |
| | .5475 | -.4052 | .5468 | -.3544 | .5459 | -.3496 | .5451 | -.3662 | .5419 | -.3168 |
| | .5972 | -.3557 | .5965 | -.3208 | .5972 | -.2855 | .5940 | -.3116 | .5945 | -.3079 |
| | .6467 | -.3165 | .6463 | -.2850 | .6468 | -.2615 | .6442 | -.2851 | .6442 | -.3187 |
| | .6769 | -.2676 | .6965 | -.2344 | .6956 | -.2264 | .6946 | -.2580 | .6930 | -.3110 |
| | .7471 | -.2049 | .7475 | -.1801 | .7455 | -.1805 | .7444 | -.2273 | .7437 | -.2790 |
| | .7981 | -.1354 | .7963 | -.1187 | .7965 | -.1351 | .7944 | -.1540 | .7941 | -.1841 |
| | .8478 | -.0693 | .8464 | -.0548 | .8458 | -.0560 | .8450 | -.0637 | .8417 | -.0870 |
| | .8984 | -.0052 | .8967 | .0098 | .8960 | .0017 | .8951 | -.0219 | .8930 | .0139 |
| | .9490 | .0761 | .9467 | .0836 | .9458 | .0869 | .9449 | .0768 | .9416 | .0858 |
| | 1.0000 | .1425 | 1.0000 | .1524 | 1.0000 | .1507 | 1.0000 | .1564 | 1.0000 | .1602 |
| LOWER SURFACE | | | | | | | | | | |
| | .0471 | .2799 | .0470 | .3040 | .0453 | .2665 | .0440 | .2090 | .0472 | -.0484 |
| | .0976 | .1710 | .0989 | .1262 | .0948 | .1124 | .0965 | .0775 | .0946 | -.0553 |
| | .1976 | -.0918 | .1975 | -.1102 | .1954 | -.0971 | .1949 | -.1163 | .1954 | -.2092 |
| | .2974 | -.2919 | .2962 | -.2827 | .2952 | -.2861 | .2931 | -.2484 | .2954 | -.3013 |
| | .3970 | -.3408 | .3968 | -.3319 | .3952 | -.3336 | .3938 | -.2940 | .3967 | -.3082 |
| | .4973 | -.3442 | .4964 | -.3109 | .4952 | -.2855 | .4942 | -.2586 | .4952 | -.2708 |
| | .5972 | -.1889 | .5948 | -.1764 | .5955 | -.1220 | .5951 | -.1066 | .5968 | -.0840 |
| | .6976 | .0293 | .6921 | .0507 | .6954 | .0928 | .6964 | .1028 | .6973 | .1056 |
| | .7967 | .1954 | .7964 | .2185 | .7953 | .2332 | .7961 | .2401 | .7912 | .2171 |
| | .8983 | .3147 | .8985 | .3198 | .8979 | .3215 | .9014 | .3230 | .9017 | .2799 |
| | .9472 | .3225 | .9497 | .3327 | .9522 | .3221 | .9476 | .3169 | .9201 | .2948 |
| | 1.0000 | .1425 | 1.0000 | .1524 | 1.0000 | .1507 | 1.0000 | .1564 | 1.0000 | .1602 |

FAR FIELD MEASUREMENT

| $Z/C_R$ | 1.231 | -1.231 |
|---|---|---|
| $Y/C_R$ | 0.0 | 0.0 |
| $X/C_R$ | $C_p$ | $C_p$ |
| -2.850 | | .0355 |
| -2.712 | .0015 | .0245 |
| -2.191 | .0143 | .0268 |
| -1.148 | .0177 | .0046 |
| -0.451 | .0479 | .0172 |
| -0.106 | .0513 | -.0052 |
| +0.240 | .0508 | -.0668 |
| 0.586 | .0272 | -.1278 |
| 0.934 | .0260 | -.1146 |
| 1.281 | .0288 | -.0159 |
| 1.627 | .0502 | -.0666 |
| 2.324 | .0352 | -.0434 |
| 3.017 | .0135 | -.0403 |
| 3.712 | -.0504 | -.0404 |

| $Z/C_R$ | 1.423 | 1.423 | 1.423 | -1.423 | -1.423 | -1.423 |
|---|---|---|---|---|---|---|
| $Y/C_R$ | .923 | 1.990 | 3.029 | .856 | 1.990 | 3.019 |
| $X/C_R$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ |
| -2.839 | -.0043 | .0006 | .0159 | .0199 | .0135 | .0187 |
| -2.378 | .0085 | .0120 | .0092 | .0062 | .0127 | .0133 |
| -1.917 | .0020 | .0122 | .0125 | .0108 | .0100 | .0147 |
| -1.455 | .0080 | .0095 | .0159 | .0150 | .0096 | .0111 |
| -1.301 | .0131 | .0159 | .0162 | .0198 | .0058 | .0169 |
| -1.148 | .0014 | .0151 | .0144 | .0184 | .0148 | .0160 |
| -0.994 | .0086 | .0165 | .0134 | .0249 | .0139 | .0119 |
| -0.840 | .0127 | .0133 | .0109 | .0280 | .0111 | .0152 |
| -0.686 | .0135 | .0159 | .0134 | .0324 | .0177 | .0174 |
| -0.532 | .0120 | .0136 | .0125 | .0385 | .0205 | .0170 |
| -0.378 | .0090 | .0095 | .0127 | .0342 | .0250 | .0194 |
| -0.225 | .0084 | .0031 | .0108 | .0487 | .0238 | .0203 |
| -0.071 | -.0111 | .0063 | .0101 | .0427 | .0293 | .0230 |
| +0.083 | -.0147 | .0005 | .0100 | .0541 | .0305 | .0257 |
| 0.237 | -.0246 | -.0072 | .0069 | .0545 | .0327 | .0278 |
| 0.390 | -.0426 | .0045 | .0058 | .0529 | .0514 | .0263 |
| 0.544 | -.0649 | -.0118 | -.0014 | .0508 | .0464 | .0275 |
| 0.698 | -.0781 | -.0229 | -.0027 | .0527 | .0488 | .0291 |
| 0.852 | -.0898 | -.0376 | -.0081 | .0485 | .0506 | .0276 |
| 1.006 | -.0903 | -.0476 | -.0143 | .0452 | .0529 | .0295 |
| 1.159 | -.0949 | -.0586 | -.0161 | .0507 | .0503 | .0310 |
| 1.313 | -.0862 | -.0627 | -.0275 | .0450 | .0481 | .0296 |
| 1.467 | -.0773 | -.0620 | -.0248 | .0361 | .0471 | .0303 |
| 1.621 | -.0664 | -.0558 | -.0202 | .0384 | .0435 | .0318 |
| 1.775 | -.0573 | -.0495 | -.0179 | .0508 | .0453 | .0332 |
| 1.928 | -.0217 | -.0429 | -.0151 | .0473 | .0447 | .0349 |
| 2.082 | -.0298 | -.0377 | -.0104 | .0420 | .0421 | .0364 |
| 2.236 | -.0340 | -.0384 | -.0044 | .0398 | .0392 | .0344 |
| 2.697 | -.0308 | -.0254 | .0055 | .0290 | .0354 | .0454 |
| 3.159 | -.0241 | -.0119 | .0309 | .0133 | .0315 | .0568 |
| 3.620 | -.0252 | -.0106 | .0286 | -.0069 | .0149 | .0559 |

TABLE VII - TABLE OF MEASURED PRESSURE COEFFICIENTS, M = .82

RUN 35 MACH .8184 ALPHA 2.940 REN 5.98 $C_L$ .52955 $C_D$ .03950 $C_M$ -.05628

WING PRESSURE DATA

| STA | .15 | | .30 | | .5 | | .7 | | .95 |
|---|---|---|---|---|---|---|---|---|---|
| $c_l$ | .48676 | | .55374 | | .60707 | | .59367 | | .39149 |
| $c_m$ | -.04090 | | -.03642 | | -.05240 | | -.06046 | | -.05195 |
| X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ |
| | | | | UPPER SURFACE | | | | | |
| .0193 | -.7682 | .0180 | -.7991 | .0185 | -.6953 | .0175 | -.5324 | .0196 | -.3268 |
| .0480 | -1.1177 | .0467 | -1.1225 | .0459 | -1.0893 | .0514 | -1.0161 | .0480 | -.6863 |
| .0975 | -1.1942 | .0968 | -1.2114 | .0975 | -1.1573 | .0956 | -1.0781 | .0929 | -.5355 |
| .1471 | -1.1390 | .1474 | -1.1789 | .1479 | -1.1544 | .1463 | -1.1020 | .1440 | -.8957 |
| .1967 | -.6929 | .1971 | -1.1459 | .1956 | -1.1471 | .1964 | -1.0955 | .1930 | -.9576 |
| .2478 | -.6603 | .2465 | -1.1315 | .2458 | -1.1327 | .2442 | -1.0981 | .2434 | -.9641 |
| .2982 | -.6655 | .2963 | -1.1002 | .2962 | -1.1213 | .2956 | -1.0855 | .2959 | -1.0045 |
| .3471 | -.6857 | .3463 | -.9344 | .3461 | -1.1055 | .3465 | -1.0859 | .3438 | -1.0219 |
| .3981 | -.6861 | .3971 | -.7444 | .3752 | -1.1110 | .3955 | -1.0888 | .3940 | -.6369 |
| .4465 | -.7244 | .4465 | -.6879 | .4466 | -1.0589 | .4438 | -1.0688 | .4426 | -.4497 |
| .4970 | -.7084 | .4777 | -.7102 | .4965 | -.5772 | .4952 | -.5766 | .4948 | -.2955 |
| .5475 | -.7022 | .5468 | -.3716 | .5459 | -.4977 | .5451 | -.4973 | .5419 | -.2530 |
| .5972 | -.3903 | .5965 | -.3070 | .5972 | -.3890 | .5940 | -.4162 | .5945 | -.2497 |
| .6467 | -.3009 | .6463 | -.2657 | .6468 | -.2927 | .6442 | -.3252 | .6442 | -.2737 |
| .6769 | -.2509 | .6965 | -.2184 | .6956 | -.2100 | .6946 | -.2470 | .6930 | -.2718 |
| .7471 | -.1996 | .7475 | -.1653 | .7455 | -.1481 | .7444 | -.1765 | .7437 | -.2444 |
| .7981 | -.1296 | .7963 | -.1058 | .7965 | -.1010 | .7944 | -.1120 | .7941 | -.1638 |
| .8478 | -.0617 | .8464 | -.0408 | .8458 | -.0346 | .8450 | -.0450 | .8417 | -.0734 |
| .8984 | .0009 | .8967 | .0242 | .8960 | .0199 | .8951 | .0029 | .8930 | .0315 |
| .9490 | .0784 | .9467 | .0931 | .9458 | .0955 | .9449 | .0737 | .9416 | .0948 |
| 1.0000 | .1640 | 1.0000 | .1540 | 1.0000 | .1334 | 1.0000 | .1277 | 1.0000 | .1624 |
| | | | | LOWER SURFACE | | | | | |
| .0471 | .2828 | .0470 | .3008 | .0453 | .2458 | .0440 | .1960 | .0472 | -.0649 |
| .0976 | .1746 | .0989 | .1240 | .0948 | .1047 | .0965 | .0667 | .0946 | -.0703 |
| .1976 | -.0940 | .1975 | -.1161 | .1954 | -.1046 | .1949 | -.1275 | .1954 | -.2249 |
| .2974 | -.3097 | .2962 | -.2960 | .2952 | -.3002 | .2931 | -.2638 | .2954 | -.3229 |
| .3970 | -.3675 | .3968 | -.3572 | .3952 | -.3530 | .3938 | -.3116 | .3967 | -.3244 |
| .4973 | -.3710 | .4964 | -.3260 | .4952 | -.2959 | .4942 | -.2712 | .4952 | -.2730 |
| .5972 | -.1984 | .5948 | -.1761 | .5955 | -.1229 | .5951 | -.1094 | .5968 | -.0799 |
| .6976 | .0275 | .6921 | .0543 | .6954 | .0934 | .6964 | .0960 | .6973 | .1096 |
| .7967 | .1957 | .7964 | .2228 | .7953 | .2353 | .7961 | .2360 | .7912 | .2207 |
| .8983 | .3150 | .8985 | .3260 | .8979 | .3241 | .9014 | .3189 | .9017 | .2839 |
| .9472 | .3264 | .9497 | .3398 | .9522 | .3245 | .9476 | .3129 | .9201 | .2975 |
| 1.0000 | .1640 | 1.0000 | .1540 | 1.0000 | .1334 | 1.0000 | .1277 | 1.0000 | .1624 |

FAR FIELD MEASUREMENT

| $Z/C_R$ | 1.231 | -1.231 | | 1.423 | 1.423 | 1.423 | -1.423 | -1.423 | -1.423 |
|---|---|---|---|---|---|---|---|---|---|
| $Y/C_R$ | 0.0 | 0.0 | | .923 | 1.990 | 3.029 | .856 | 1.990 | 3.019 |
| $X/C_R$ | $C_p$ | $C_p$ | $X/C_R$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ |
| -2.850 | | .0145 | -2.839 | -.0027 | .0034 | .0231 | .0218 | .0152 | .0242 |
| -2.712 | .0003 | .0290 | -2.378 | .0089 | .0143 | .0122 | .0066 | .0149 | .0168 |
| -2.191 | .0132 | .0280 | -1.917 | .0040 | .0140 | .0119 | .0129 | .0112 | .0158 |
| -1.148 | .0166 | .0069 | -1.455 | .0096 | .0132 | .0164 | .0160 | .0133 | .0134 |
| -0.451 | .0522 | .0194 | -1.301 | .0138 | .0150 | .0147 | .0198 | .0043 | .0159 |
| -0.106 | .0607 | .0000 | -1.148 | .0045 | .0168 | .0157 | .0212 | .0153 | .0161 |
| +0.240 | .0549 | -.0595 | -0.994 | .0117 | .0199 | .0135 | .0270 | .0162 | .0127 |
| 0.586 | .0265 | -.1284 | -0.840 | .0157 | .0175 | .0128 | .0309 | .0151 | .0169 |
| 0.934 | .0355 | -.1187 | -0.686 | .0160 | .0179 | .0153 | .0343 | .0201 | .0164 |
| 1.281 | .0322 | -.0141 | -0.532 | .0157 | .0177 | .0198 | .0419 | .0232 | .0221 |
| 1.627 | .0568 | -.0667 | -0.378 | .0150 | .0133 | .0158 | .0398 | .0262 | .0212 |
| 2.324 | .0405 | -.0410 | -0.225 | .0142 | .0074 | .0135 | .0534 | .0274 | .0226 |
| 3.017 | .0174 | -.0367 | -0.071 | -.0051 | .0138 | .0156 | .0473 | .0337 | .0275 |
| 3.712 | -.0465 | -.0372 | +0.083 | -.0065 | .0082 | .0139 | .0596 | .0363 | .0292 |
| | | | 0.237 | -.0184 | -.0005 | .0121 | .0572 | .0374 | .0324 |
| | | | 0.390 | -.0340 | .0156 | .0088 | .0571 | .0602 | .0286 |
| | | | 0.544 | -.0577 | -.0043 | .0038 | .0553 | .0513 | .0309 |
| | | | 0.698 | -.0753 | -.0184 | .0004 | .0559 | .0496 | .0318 |
| | | | 0.852 | -.0880 | -.0332 | -.0030 | .0549 | .0527 | .0320 |
| | | | 1.006 | -.0936 | -.0475 | -.0102 | .0468 | .0526 | .0326 |
| | | | 1.159 | -.0973 | -.0592 | -.0138 | .0546 | .0512 | .0331 |
| | | | 1.313 | -.0858 | -.0640 | -.0239 | .0513 | .0495 | .0347 |
| | | | 1.467 | -.0761 | -.0623 | -.0220 | .0426 | .0500 | .0338 |
| | | | 1.621 | -.0664 | -.0578 | -.0177 | .0435 | .0444 | .0346 |
| | | | 1.775 | -.0565 | -.0459 | -.0165 | .0557 | .0523 | .0346 |
| | | | 1.928 | -.0214 | -.0424 | -.0127 | .0506 | .0479 | .0372 |
| | | | 2.082 | -.0295 | -.0371 | -.0080 | .0463 | .0458 | .0408 |
| | | | 2.236 | -.0332 | -.0370 | -.0033 | .0453 | .0440 | .0398 |
| | | | 2.697 | -.0281 | -.0248 | .0078 | .0353 | .0397 | .0496 |
| | | | 3.159 | -.0224 | -.0101 | .0345 | .0182 | .0360 | .0631 |
| | | | 3.620 | -.0255 | -.0114 | .0316 | -.0036 | .0177 | .0600 |

TABLE VIII - TABLE OF MEASURED PRESSURE COEFFICIENTS, M = .84

RUN 98 MACH .8387 ALPHA 2.931 REN 6.05 $C_L$ .51149 $C_D$ .04512 $C_M$ -.05052

WING PRESSURE DATA

| STA | .15 | | .30 | | .5 | | .7 | | .95 |
|---|---|---|---|---|---|---|---|---|---|
| $c_l$ | .4827 | | .55731 | | .59315 | | .53559 | | .35603 |
| $c_m$ | -.04874 | | -.04545 | | -.06374 | | -.06222 | | -.04954 |
| X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ |
| | | | | UPPER SURFACE | | | | | |
| .0193 | -.6971 | .0180 | -.7034 | .0185 | -.6195 | .0175 | -.4503 | .0196 | -.2504 |
| .0480 | -1.0352 | .0467 | -1.0200 | .0459 | -.9869 | .0514 | -.9260 | .0480 | -.5955 |
| .0975 | -1.1179 | .0968 | -1.1410 | .0975 | -1.0741 | .0956 | -.9934 | .0929 | -.5600 |
| .1471 | -1.0679 | .1474 | -1.0941 | .1479 | -1.0818 | .1463 | -1.0276 | .1440 | -.8096 |
| .1967 | -.6504 | .1971 | -1.0744 | .1956 | -1.0739 | .1964 | -1.0196 | .1930 | -.8818 |
| .2478 | -.6320 | .2465 | -1.0674 | .2458 | -1.0659 | .2442 | -1.0268 | .2434 | -.8937 |
| .2982 | -.6410 | .2963 | -1.0445 | .2962 | -1.0618 | .2956 | -1.0204 | .2959 | -.9431 |
| .3471 | -.6509 | .3463 | -1.0138 | .3461 | -1.0521 | .3465 | -1.0260 | .3438 | -.9713 |
| .3981 | -.6630 | .3971 | -.7581 | .3752 | -1.0611 | .3955 | -1.0262 | .3940 | -.9636 |
| .4465 | -.7148 | .4465 | -.7467 | .4466 | -1.0403 | .4438 | -.9233 | .4426 | -.4955 |
| .4970 | -.6972 | .4777 | -.7473 | .4965 | -.6161 | .4952 | -.4512 | .4948 | -.3396 |
| .5475 | -.7127 | .5468 | -.7660 | .5459 | -.5201 | .5451 | -.4322 | .5419 | -.2522 |
| .5972 | -.7121 | .5965 | -.4410 | .5972 | -.4774 | .5940 | -.3984 | .5945 | -.2115 |
| .6467 | -.5229 | .6463 | -.2730 | .6468 | -.4188 | .6442 | -.3477 | .6442 | -.2164 |
| .6769 | -.2576 | .6965 | -.1985 | .6956 | -.3362 | .6946 | -.2905 | .6930 | -.2262 |
| .7471 | -.1735 | .7475 | -.1393 | .7455 | -.2351 | .7444 | -.2333 | .7437 | -.2086 |
| .7981 | -.1093 | .7963 | -.0814 | .7965 | -.1337 | .7944 | -.1789 | .7941 | -.1335 |
| .8478 | -.0467 | .8464 | -.0214 | .8458 | -.0525 | .8450 | -.1260 | .8417 | -.0490 |
| .8984 | .0136 | .8967 | .0378 | .8960 | .0154 | .8951 | -.0732 | .8930 | .0421 |
| .9490 | .0888 | .9467 | .1031 | .9458 | .0487 | .9449 | -.1013 | .9416 | .0999 |
| 1.0000 | .1327 | 1.0000 | .1409 | 1.0000 | .1150 | 1.0000 | -.0412 | 1.0000 | .1689 |
| | | | | LOWER SURFACE | | | | | |
| .0471 | .2890 | .0470 | .2981 | .0453 | .2525 | .0440 | .1780 | .0472 | -.1055 |
| .0976 | .1812 | .0989 | .1233 | .0948 | .0991 | .0965 | .0511 | .0946 | -.0985 |
| .1976 | -.0859 | .1975 | -.1191 | .1954 | -.1158 | .1949 | -.1488 | .1954 | -.2637 |
| .2974 | -.3009 | .2962 | -.3135 | .2952 | -.3226 | .2931 | -.3008 | .2954 | -.3856 |
| .3970 | -.3669 | .3968 | -.3845 | .3952 | -.3889 | .3938 | -.3584 | .3967 | -.3610 |
| .4973 | -.3965 | .4964 | -.3422 | .4952 | -.3196 | .4942 | -.3228 | .4952 | -.3090 |
| .5972 | -.1979 | .5948 | -.1807 | .5955 | -.1311 | .5951 | -.1460 | .5968 | -.0851 |
| .6976 | .0307 | .6921 | .0543 | .6954 | .0818 | .6964 | .0494 | .6973 | .1047 |
| .7967 | .2003 | .7964 | .2229 | .7953 | .2260 | .7961 | .1933 | .7912 | .2165 |
| .8983 | .3220 | .8985 | .3262 | .8979 | .3146 | .9014 | .2722 | .9017 | .2867 |
| .9472 | .3306 | .9497 | .3404 | .9522 | .3129 | .9476 | .2503 | .9201 | .3014 |
| 1.0000 | .1327 | 1.0000 | .1409 | 1.0000 | .1150 | 1.0000 | -.0412 | 1.0000 | .1689 |

FAR FIELD MEASUREMENT

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| $Z/C_R$ | 1.231 | -1.231 | | 1.423 | 1.423 | 1.423 | -1.423 | -1.423 | -1.423 |
| $Y/C_R$ | 0.0 | 0.0 | | .923 | 1.990 | 3.029 | .856 | 1.990 | 3.019 |
| $X/C_R$ | $C_p$ | $C_p$ | $X/C_R$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ |
| -2.850 | | .0332 | -2.839 | .0007 | .0058 | .0196 | .0240 | .0181 | .0213 |
| -2.712 | .0120 | .0313 | -2.378 | .0130 | .0168 | .0133 | .0108 | .0172 | .0178 |
| -2.191 | .0215 | .0314 | -1.917 | .0068 | .0168 | .0168 | .0185 | .0134 | .0197 |
| -1.148 | .0237 | .0125 | -1.455 | .0147 | .0160 | .0212 | .0211 | .0160 | .0180 |
| -0.451 | .0545 | .0278 | -1.301 | .0187 | .0201 | .0180 | .0243 | .0092 | .0187 |
| -0.106 | .0627 | .0103 | -1.148 | .0081 | .0221 | .0193 | .0241 | .0211 | .0199 |
| +0.240 | .0600 | -.0454 | -0.994 | .0146 | .0213 | .0173 | .0296 | .0177 | .0160 |
| 0.586 | .0315 | -.1392 | -0.840 | .0210 | .0216 | .0179 | .0353 | .0179 | .0206 |
| 0.934 | .0287 | -.1321 | -0.686 | .0210 | .0243 | .0219 | .0384 | .0244 | .0229 |
| 1.281 | .0359 | -.0141 | -0.532 | .0222 | .0229 | .0201 | .0467 | .0272 | .0225 |
| 1.627 | .0573 | -.0661 | -0.378 | .0202 | .0199 | .0191 | .0427 | .0320 | .0248 |
| 2.324 | .0437 | -.0376 | -0.225 | .0202 | .0155 | .0199 | .0573 | .0329 | .0279 |
| 3.017 | .0237 | -.0335 | -0.071 | .0032 | .0177 | .0191 | .0528 | .0377 | .0297 |
| 3.712 | -.0397 | -.0305 | +0.083 | .0004 | .0133 | .0199 | .0637 | .0397 | .0320 |
| | | | 0.237 | -.0112 | .0049 | .0166 | .0618 | .0409 | .0354 |
| | | | 0.390 | -.0289 | .0133 | .0139 | .0611 | .0565 | .0325 |
| | | | 0.544 | -.0561 | -.0009 | .0067 | .0573 | .0509 | .0325 |
| | | | 0.698 | -.0781 | -.0130 | .0042 | .0563 | .0517 | .0342 |
| | | | 0.852 | -.0955 | -.0295 | -.0010 | .0533 | .0536 | .0325 |
| | | | 1.006 | -.1016 | -.0477 | -.0068 | .0466 | .0507 | .0346 |
| | | | 1.159 | -.1036 | -.0599 | -.0112 | .0556 | .0494 | .0337 |
| | | | 1.313 | -.0946 | -.0659 | -.0251 | .0475 | .0460 | .0324 |
| | | | 1.467 | -.0801 | -.0623 | -.0232 | .0416 | .0476 | .0308 |
| | | | 1.621 | -.0676 | -.0551 | -.0162 | .0435 | .0449 | .0337 |
| | | | 1.775 | -.0576 | -.0480 | -.0162 | .0558 | .0468 | .0333 |
| | | | 1.928 | -.0195 | -.0407 | -.0115 | .0531 | .0462 | .0370 |
| | | | 2.082 | -.0258 | -.0332 | -.0072 | .0498 | .0468 | .0390 |
| | | | 2.236 | -.0302 | -.0346 | -.0020 | .0472 | .0429 | .0366 |
| | | | 2.697 | -.0253 | -.0206 | .0125 | .0378 | .0411 | .0513 |
| | | | 3.159 | -.0182 | -.0046 | .0407 | .0223 | .0398 | .0670 |
| | | | 3.620 | -.0171 | -.0039 | .0378 | .0036 | .0234 | .0660 |

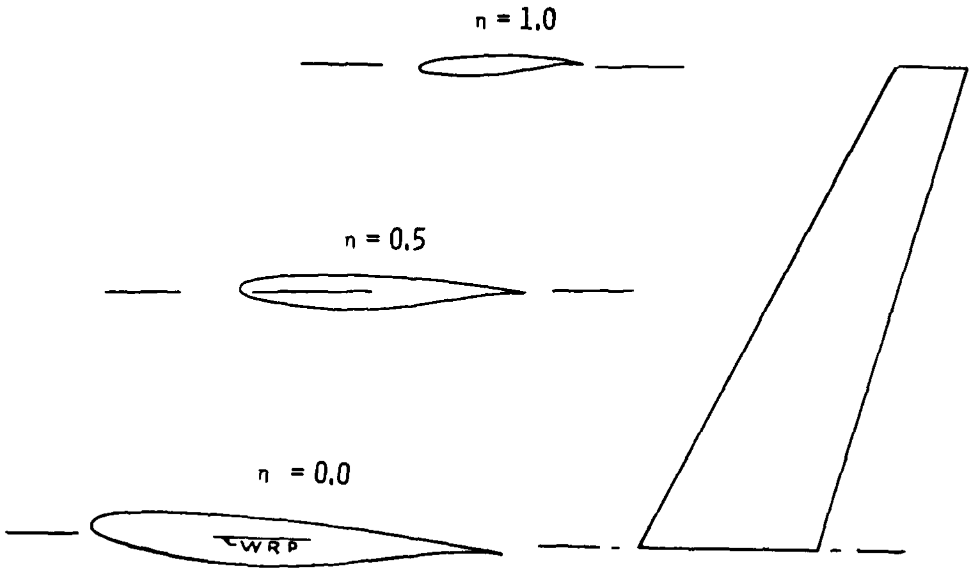



Figure 6.1 - Wing A Geometry

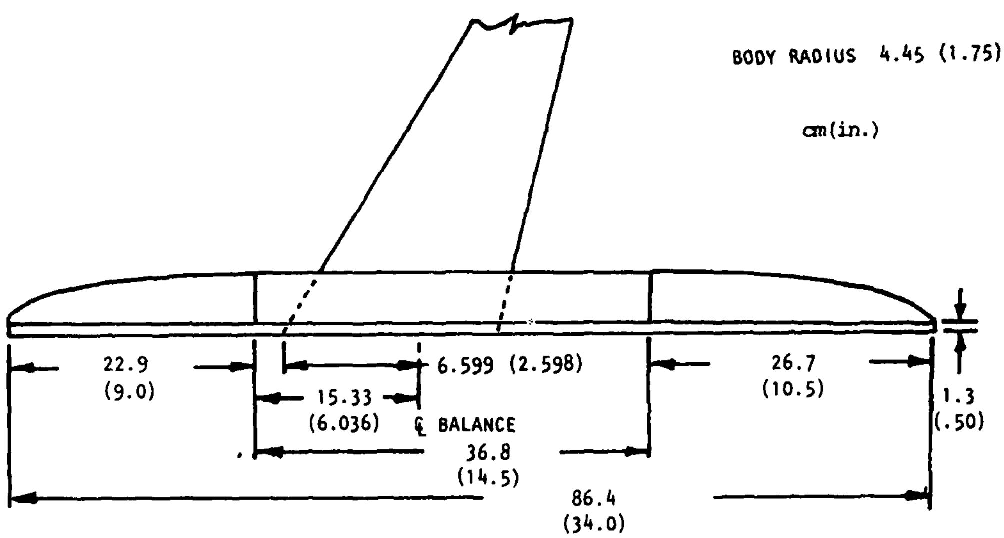



Figure 6.2 - Wing Body Geometry

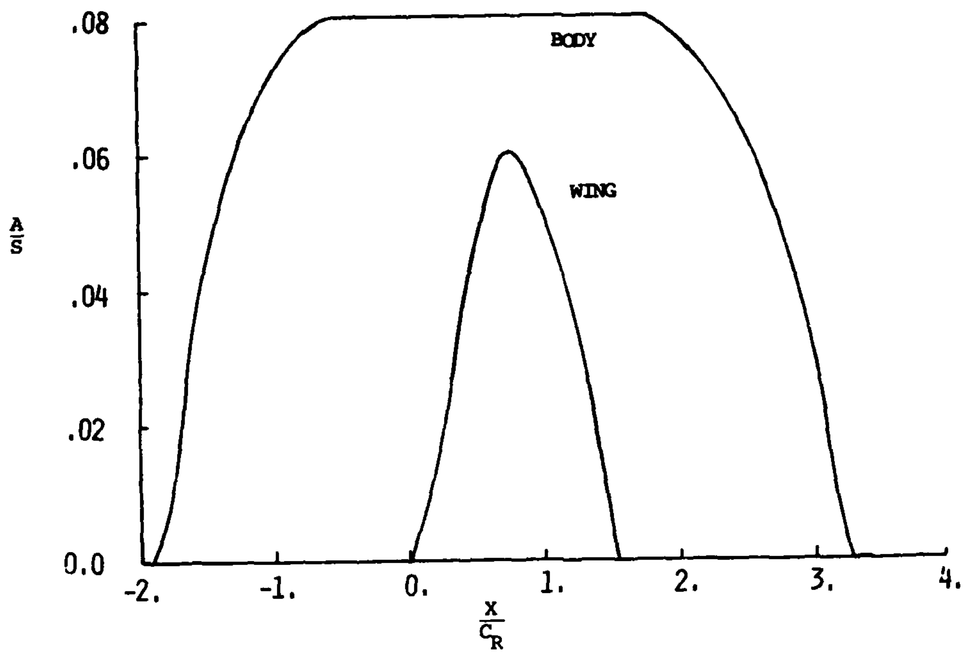



Figure 6.3 - Model Area Distribution

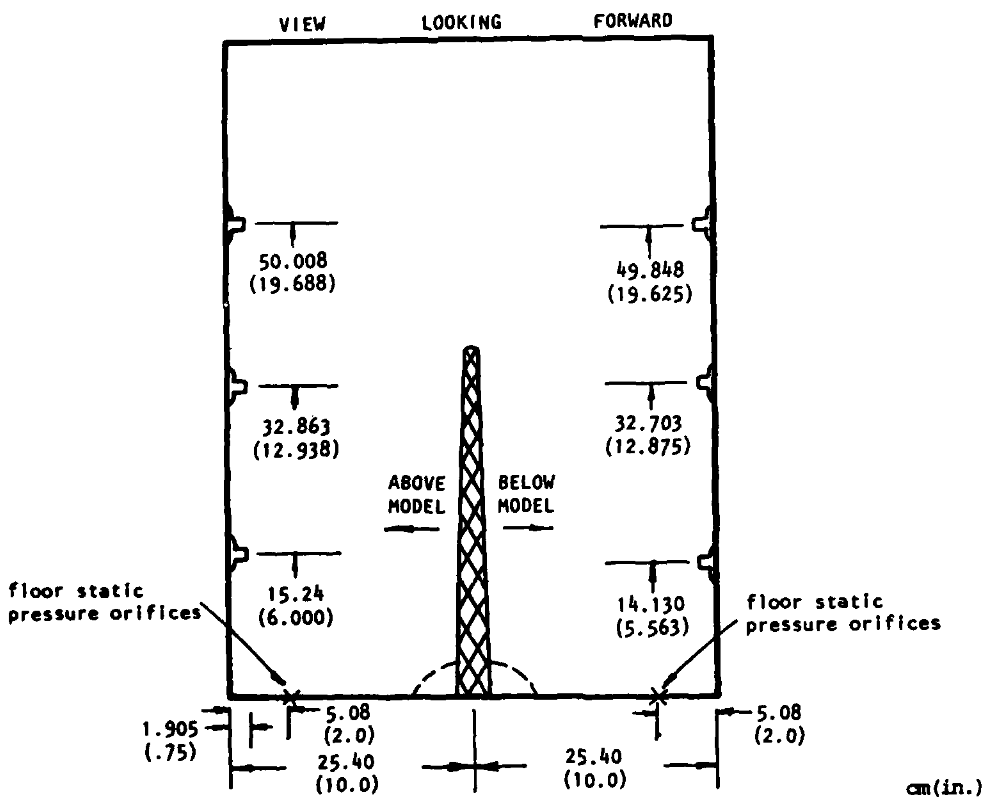



Figure 6.4 - Far Field Pressure Rail Location

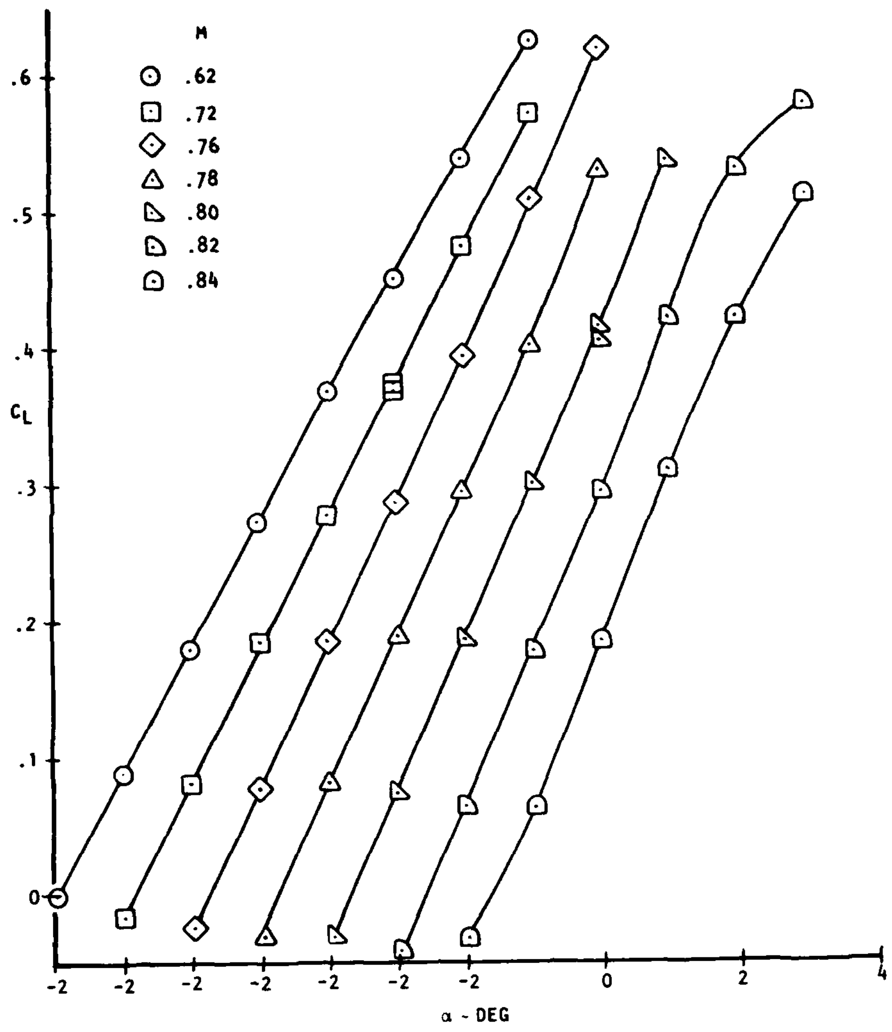



Figure 6.5 - Summary of Lift

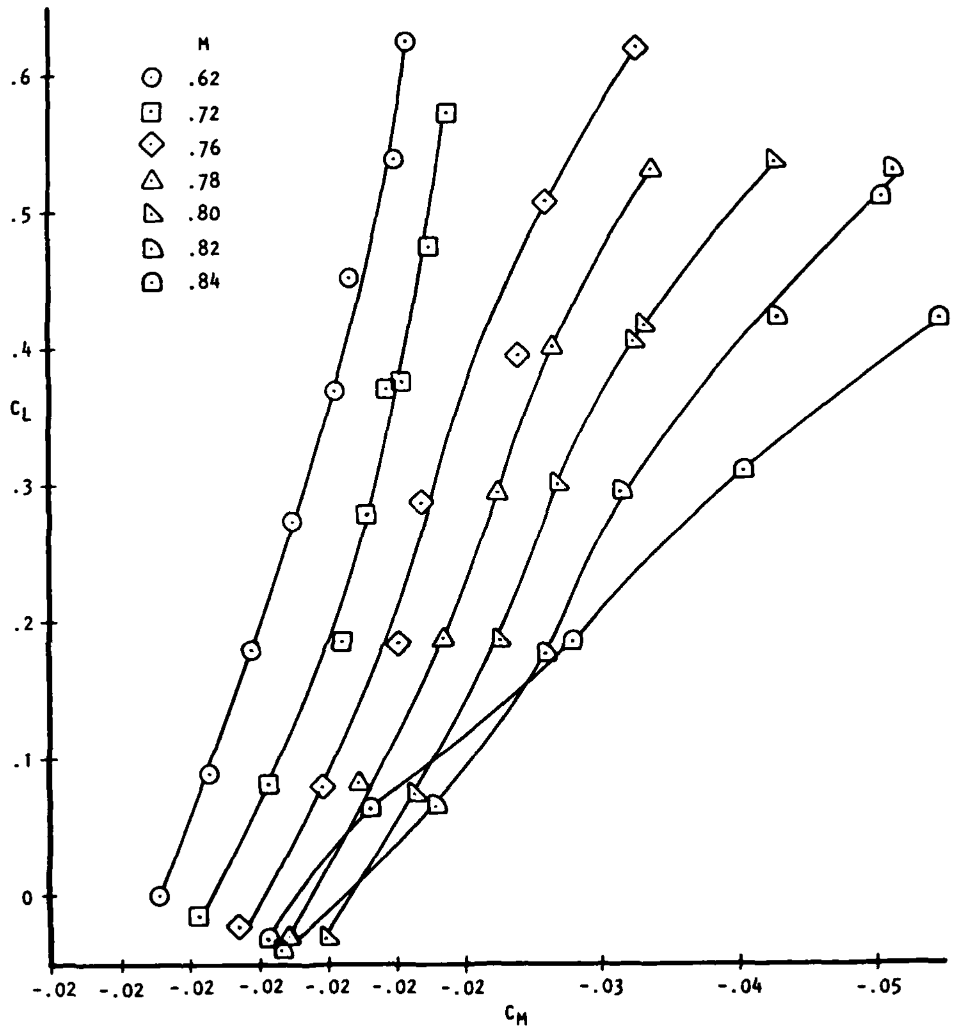



Figure 6.6 - Summary of Pitching Moment

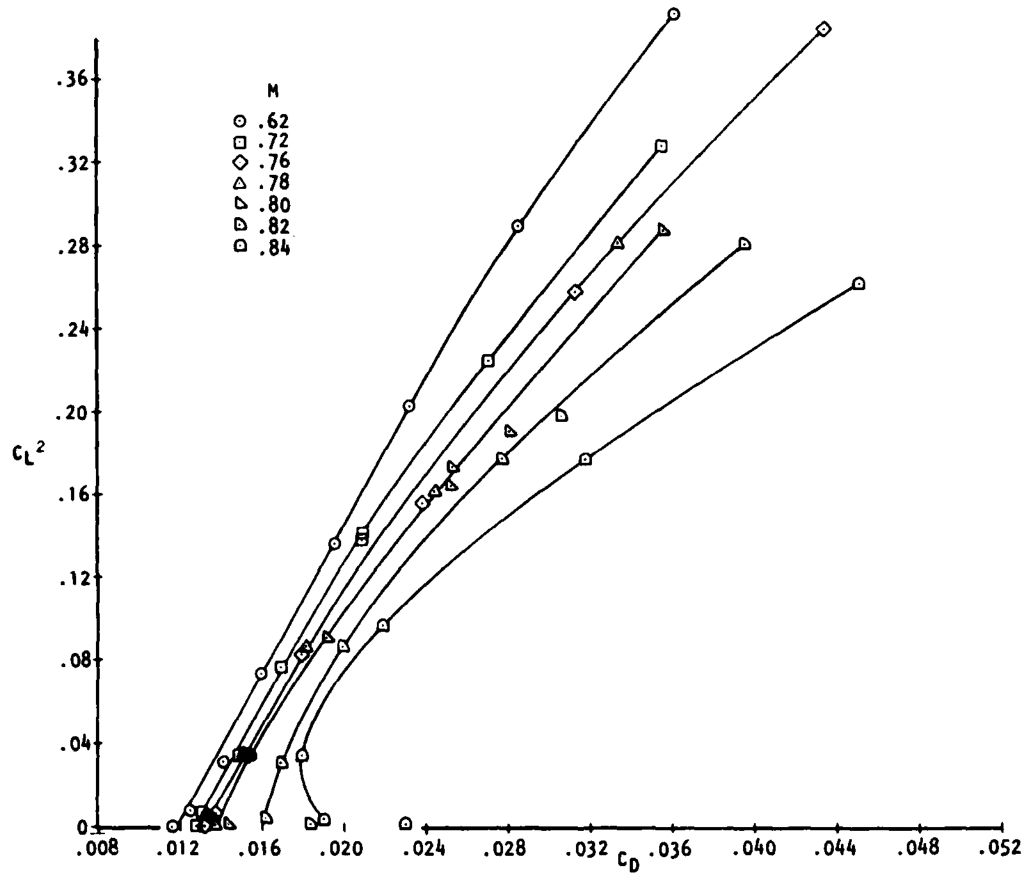



Figure 6.7 - Summary of Drag Data

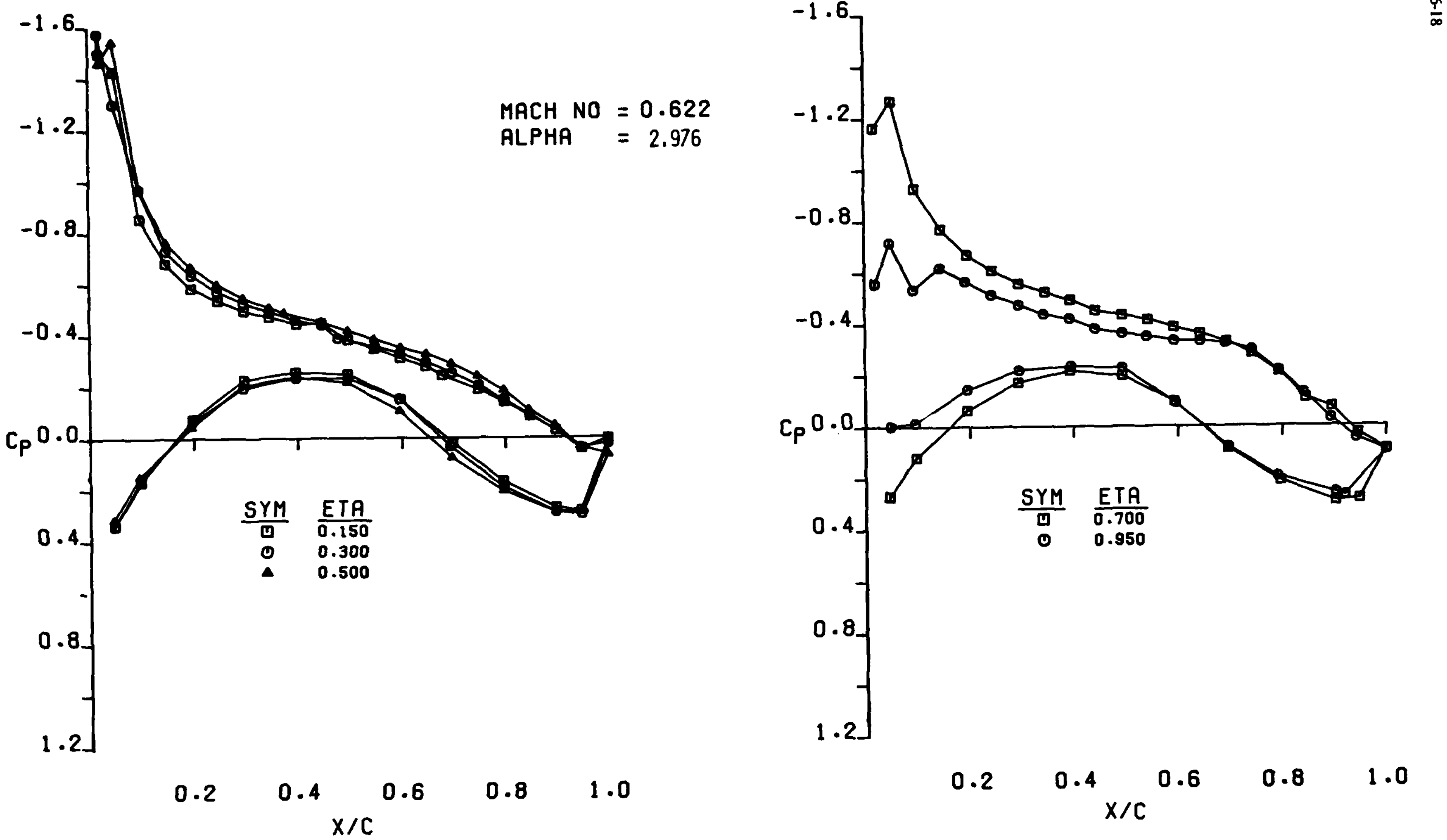



Figure 6.8 - Wing Pressure Data, M = .62

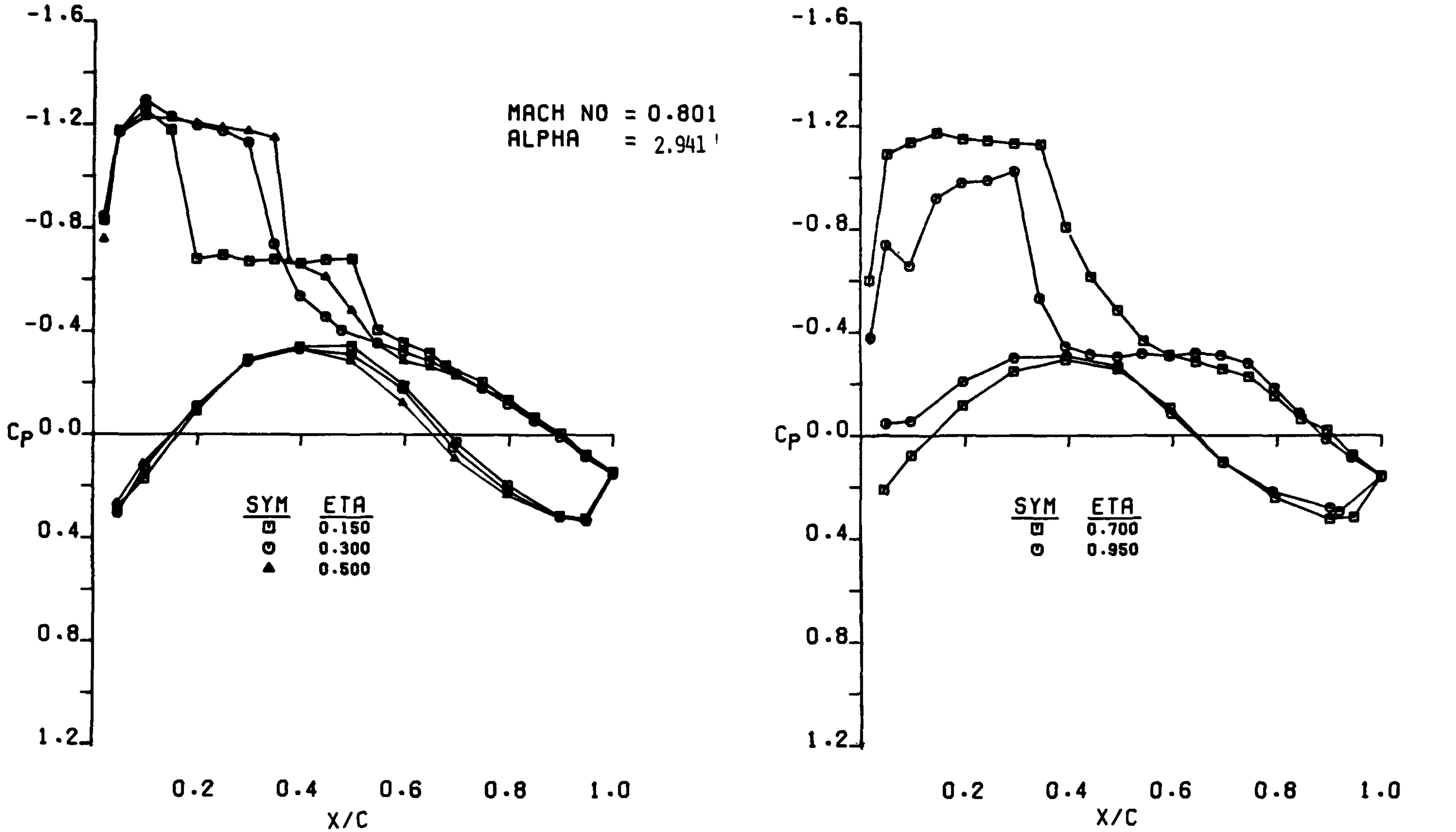



Figure 6.9 - Wing Pressure Data, M = .80

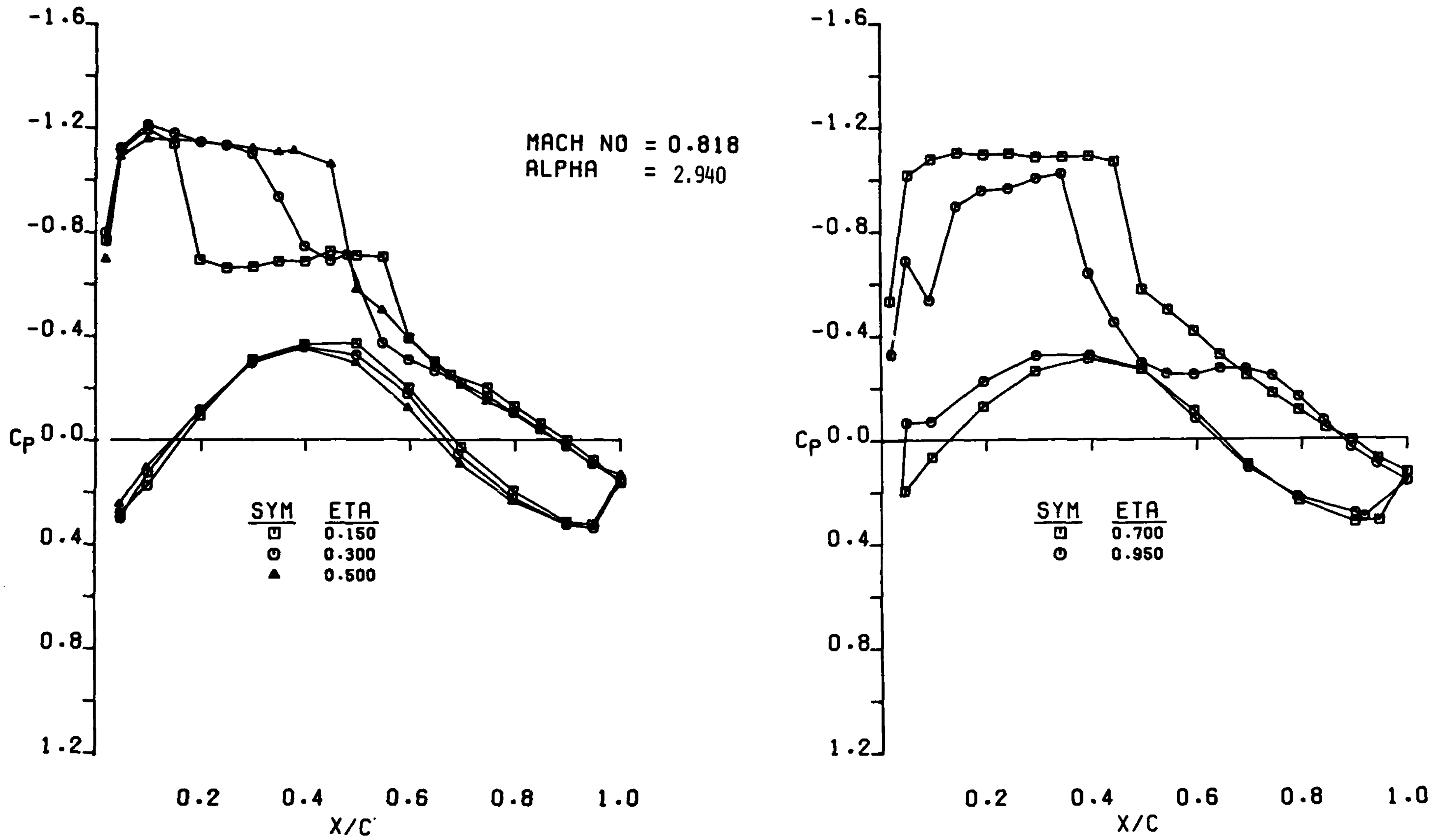



Figure 6.10 - Wing Pressure Data, M = .82

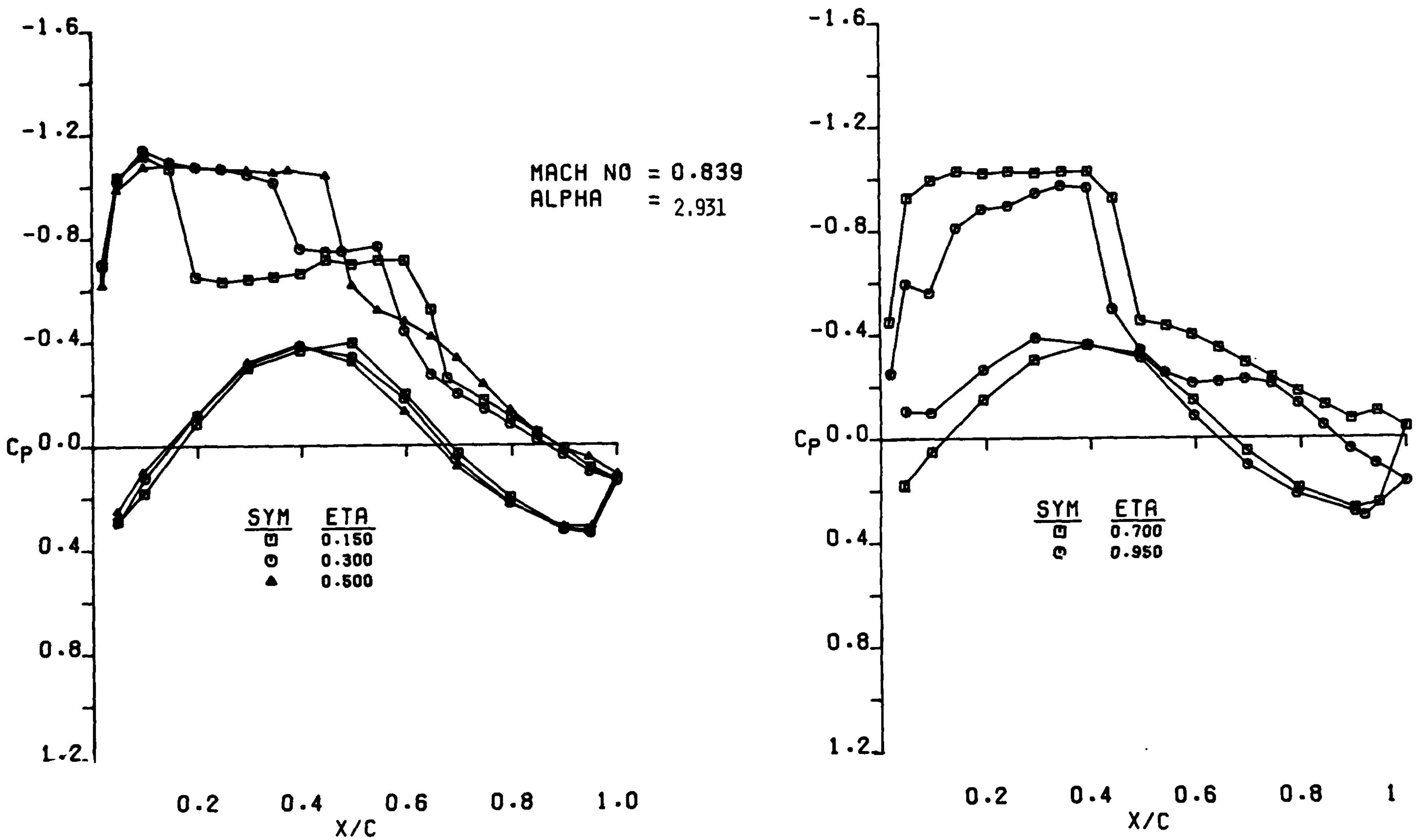
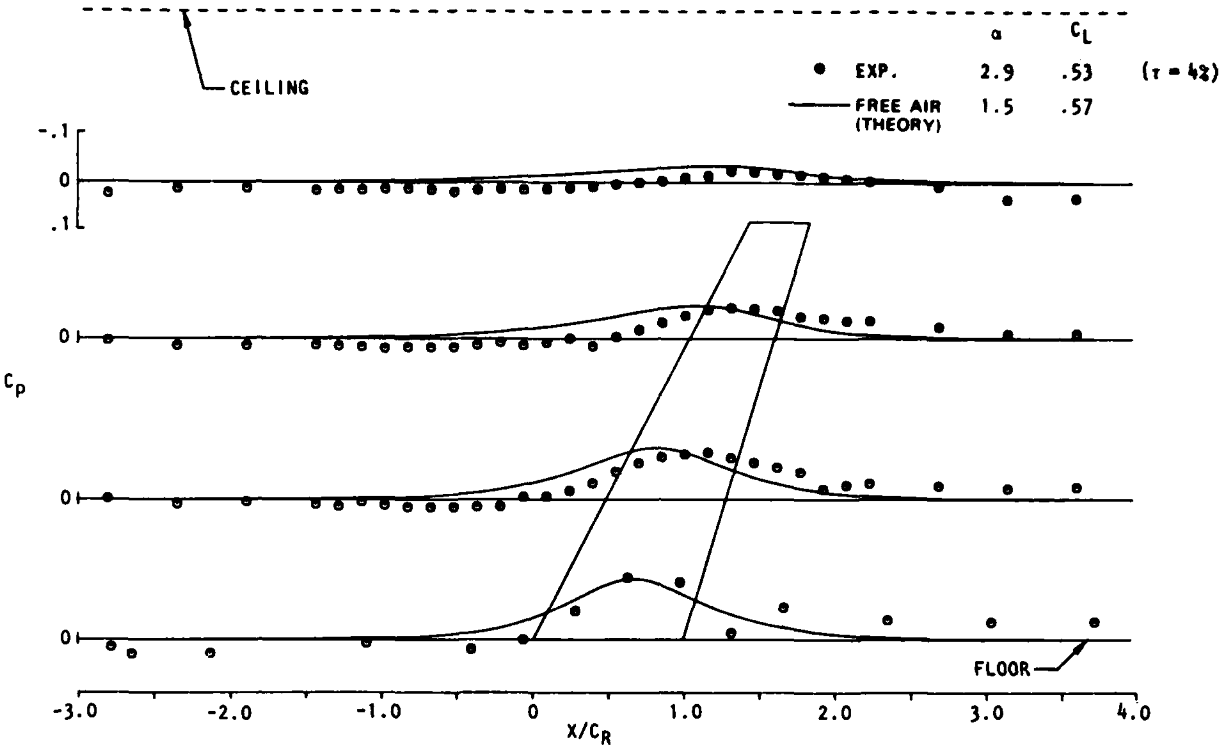
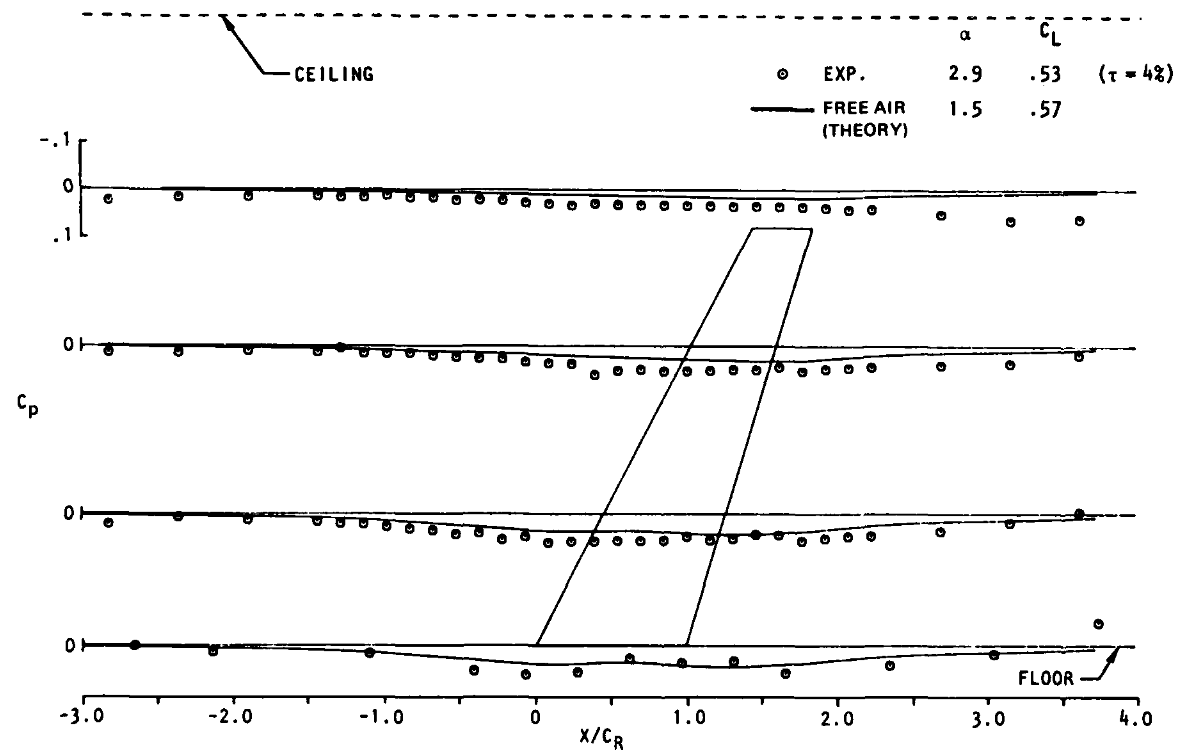



Figure 6.11 - Wing Pressure Data, M = .84




(a) Above wing




(b) Below wing

Figure 6.12 - Far Field Pressure Data, M = .82

# 7. TRANSONIC WING AND FAR FIELD TEST DATA ON A MODERATE ASPECT RATIO WING FOR THREE DIMENSIONAL COMPUTATIONAL METHOD EVALUATION

BY

K.P. BURDGES AND B.L. HINSON
LOCKHEED-GEORGIA COMPANY
86 SOUTH COBB DRIVE
MARIETTA, GEORGIA 30063

## 7.1 INTRODUCTION

The data presented in this contribution were obtained in the Lockheed-Georgia Compressible Flow Wind Tunnel as part of a research program sponsored by the United States Air Force Office of Scientific Research. The intent of the experiment was to provide force and pressure data on a state-of-the-art supercritical moderate aspect ratio fighter wing for evaluation of three-dimensional flow computation methods. The wing, though simply defined, is representative of high performance supercritical technology. The supersonic flow region exhibits a swept shock wave that partially recompresses the supersonic flow and an unswept aft terminal shock that produces the classic lamda pattern. This wing with its more highly swept leading edge and complex shock pattern will provide a challenging test case for three-dimensional transonic flow programs.

In the past, there has been some lack of understanding as to the far field boundary conditions in wind tunnel experiments, e.g. porous walls. The accuracy of current computational methods has caused concern over the influence of small differences between far field boundary conditions of wind tunnel experiments and the free air boundary condition applied at the edge of the mathematical computational zone. In an effort to improve the rigor of the code evaluation, a far field boundary condition was measured in the experiment to be included as a boundary condition when evaluating computational methods.

Experimental longitudinal static pressure distributions near the wind tunnel walls were measured at 4 spanwise positions, above and below the model. These measurements are included in the data set. Other measurements, such as the effect of wall porosity and empty tunnel pressure distributions were obtained, but are not appropriate in this data set. All data presented are not corrected for any wind tunnel wall interference.

A simple body was included in the original test program to provide wing/body interference effects as well. These data are not included in this data set, but are available on magnetic tape through the United States Air Force Office of Scientific Research, Bolling Air Force Base, D.C.

## 7.2 DATA SET

1. General Description

| | | |
|---|---|---|
| 1.1 | Model Designation or Name | LOCKHEED - AFOSR Wing B |
| 1.2 | Model Type | Semi Span Wing. (Wing body data in Reference Report) |
| 1.3 | Design Requirement/Conditions | This model was designed to provide state-of-the-art transonic performance characteristics, but with a simple geometry suitable for ease of input into theoretical math models. |
| 1.4 | Additional Remarks | Extensive far field boundary condition measurements were made to provide a rigorous test case for theoretical models and eliminate uncertainties about wall effects. |

2. Model Geometry

2.1 Wing Data

| | | |
|---|---|---|
| 2.1.1 | Wing Planform | Simple, swept back, tapered - See Figure 7.1. |
| 2.1.2 | Aspect Ratio | 3.8 |
| 2.1.3 | Quarter Chord Sweep | 30.0° |

| | | |
|---|---|---|
| 2.1.4 | Trailing Edge Sweep | 13.4° |
| 2.1.5 | Taper Ratio | 0.4 |
| 2.1.6 | Twist | 6.5° |
| 2.1.7 | Mean Aerodynamic Chord | 17.71 cm (6.974 in) |
| 2.1.8 | Span or Semispan | 31.8 cm (12.5 in) Semispan |
| 2.1.9 | Number of Airfoil Sections Used to Define Wing | Two, t/c = .06 Supercritical |
| 2.1.10 | Spanwise Location of Reference Section and Section Coordinates (Note if Ordinates are Design or Actual Measured Values) | y/b = 0, 1.0 Design Coordinates in Table I |
| 2.1.11 | Lofting Procedure Between Reference Sections | Straight Line |
| 2.1.12 | Form of Wing-Body Fillet, Strakes | None |
| 2.1.13 | Form of Wing Tip | Airfoil thickness form rotated about camber line |
| 2.2 | Body Data (Detail Description of Body Geometry) | See Figure 7.2. |
| 2.3 | Wing-Body Combination | |
| 2.3.1 | Relative Body Diameter (Average Body Diameter at Wing Location Divided by Wing Span) | .140 |
| 2.3.2 | Relative Vertical Location of Wing (Height Above or Below Axis Divided by Average Body Radius at Wing Location) | Three Positions: high, medium, low - Wing. See Reference Report. |
| 2.3.3 | Wing Setting Angle | 2.5° |
| 2.3.4 | Dihedral | 0 |
| 2.4 | Cross Sectional Area Development | See Figure 7.3 |
| 2.5 | Fabrication Tolerances/Waviness | ± .05 mm |

3. <u>Wind Tunnel</u>

| | | |
|---|---|---|
| 3.1 | Designation | Lockheed-Georgia Compressible Flow Wind Tunnel |
| 3.2 | Type of Tunnel | |
| 3.2.1 | Continuous or Blowdown Indicate Minimum Run Time if Applicable | Blow down<br>12 sec. (Max. = 120 sec.) |
| 3.2.2 | Stagnation Pressure | 19 - 172 dynes/cm$^2$ (20-175 PSIA) |
| 3.2.3 | Stagnation Temperature | 266 - 311 K (480 - 560° R) |
| 3.3 | Test Section | |
| 3.3.1 | Shape of Test Section | Rectangular |
| 3.3.2 | Size of Test Section (Width, Height, Length) | 50.8 cm (20.0 in) x 71.2 cm (28.0 in) x 183 cm (72.0 in) |

| | | |
|---|---|---|
| 3.3.3 | Type of Test Section Walls Closed, Open, Slotted, Perforated) | Solid at model centerline (floor of tunnel). Perforated with 60° inclined holes |
| | Open Area Ratio (Give Range if Variable) | 0 - 10% |
| | Slot/Hole Geometry (e.g., 30-Degree Slanted Holes) | 60° slanted holes in two sliding plates |
| | Treatment of Side Wall Boundary Layer | |
| | Full-Span Model | No treatment |
| | Half-Model Testing | Floor boundary layer removed (model centerline) 53.6 cm (21.0 in) ahead of balance centerline. |
| 3.4 | Flow Field (Empty Test Section) | |
| 3.4.1 | Reference Static Pressure | Wall static upstream of porous section |
| 3.4.2 | Flow Angularity | 0 |
| 3.4.3 | Mach Number Distribution | Shown in Ref. Rept. |
| 3.4.4 | Pressure Gradient | Shown in Ref. Rept. |
| 3.4.5 | Turbulence/Noise Level | Not measured |
| 3.5 | Freestream Mach Number (or Velocity) | |
| 3.5.1 | Range | 0.2 to 1.1 |
| 3.5.2 | Pressure Used to Determine Mach Number (e.g., Settling Chamber Total Pressure and Plenum Chamber Pressure) | Settling chamber total pressure and wall static pressure |
| 3.5.3 | Accuracy of Mach Number Determination ($\Delta M$) | .002 |
| 3.5.4 | Maximum Mach Number Variation During a Run | .005 |
| 3.6 | Reynolds Number Range | |
| 3.6.1 | Unit Reynolds Number Range (Give Range at Representative Mach Numbers; 1/m) | 15 to 150 million per meter |
| 3.6.2 | Means of Varying Reynolds Number (e.g., by Pressurization) | Pressurization |
| 3.7 | Temperature Range and Dewpoint, Can Temperature be Controlled? | Temp not controlled<br>Dewpoint = 222 K (400°R) |
| 3.8 | Model Attitudes | |
| 3.8.1 | Angle-of-Attack | Constant during run |
| 3.8.2 | Accuracy in Determining Angles | 0.05 Deg. |
| 3.9 | Organization Operating the Tunnel and Location of Tunnel | Lockheed-Georgia Co. |
| 3.10 | Who is to be Contacted for Additional Information | K. P. Burdges<br>Dept. 72-74, Zone 403<br>Lockheed-Georgia Co.<br>Marietta, Ga. 30063 USA |

| | | |
|---|---|---|
| 3.11 | Literature Concerning this Facility | G.A. Pounds and Stanewsky, E., "The Compressible Flow Facility, Part 1: Design" Lockheed GA. Co. ER 9219-1, Oct. 1967. |
| 3.12 | Additional Remarks | |

4. <u>Tests</u>

| | | |
|---|---|---|
| 4.1 | Type of Tests | Transonic force and pressure |
| 4.2 | Wing Span or Semispan to Tunnel Width | .46 |
| 4.3 | Test Conditions | |
| 4.3.1 | Angle-of-Attack | -2.0 to 5.0 Degrees |
| 4.3.2 | Mach Number | 0.70 to 0.94 |
| 4.3.3 | Dynamic Pressure | 14.4 dynes/cm$^2$ (14.6 psia) |
| 4.3.4 | Reynolds Number | 10 Million based on MAC |
| 4.3.5 | Stagnation Temperature | 289 K (520°R) |
| 4.4 | Transition | |
| 4.4.1 | Free or Fixed | Fixed |
| 4.4.2 | Position of Free Transition | |
| 4.4.3 | Position of Fixed Transition, Width of Strips, Size and Type of Roughness Elements | 1.2 mm (.05 in) wide strip of glass beads 0.058 mm (0.0023 in) dia located .05 MAC from LE |
| 4.4.4 | Were Checks Made to Determine if Transition Occurred at Trip Locations? | No |
| 4.5 | Bending or Torsion Under Load | |
| 4.5.1 | Describe Any Aero-elastic Measurements Made During Tests | None |
| 4.5.2 | Describe Results of Any Bench Calibrations | None |
| 4.6 | Were Different Sized Models Used in Wind-Tunnel Investigation? If so, Indicate Sizes | No |
| 4.7 | Areas and Length Used to Form Coefficients | Wing Area - 530.0 cm$^2$ (82.1 in.$^2$)<br>Mean Aerodynamic Chord 17.71 cm (6.974 in)<br>Wing Semispan - 31.8 cm (12.5 in) |
| 4.8 | References on Tests | Hinson, B. L. and Burdges, K.P., "Acquisition and Application of Transonic Wing and Far-Field Test Data for Three-Dimensional Computational Method Evaluation," AFOSR-TR-80-0421, March 1980. |
| 4.9 | Additional Remarks | Ratio of model solid blockage area to test section cross-sectional area:<br>Wing - 0.009<br>Wing with body - 0.019 |

5. Instrumentation

5.1 Surface Pressure Measurements

| | |
|---|---|
| 5.1.1 Pressure Orifices in Wing. Location and Number on Upper and Lower Surfaces | 110 upper surface, 50 lower surface measured positions in Table II |
| 5.1.2 Pressure Orifices on Fuselage. Location and Number | None |
| 5.1.3 Pressure Orifices on Components, Give Component and Orifice Location | None |
| 5.1.4 Geometry of Orifices | Normal to surface, .5 mm (.020 in) dia. |
| 5.1.5 Type of Pressure Transducer and Scanning Devices Used. Indicate Range and Accuracy | Statham 12.5 psid transducers Scanivalve Model J2<br>0.5% Full Scale |

5.2 Force Measurements

5.2.1 Type and Location of Balance — 5 component floor balance (semispan)

5.2.2 Forces and Moments that can be Measured. Maximum Loads and Accuracy

| | | |
|---|---|---|
| Normal Force: | 3.34 kN; | ±0.25% |
| Axial Force: | 334 N; | ±0.25% |
| Pitching Moment: | 203 m-N; | ±0.25% |
| Rolling Moment: | 678 m-N; | ±0.25% |
| Yawing Moment: | 68 m-N; | ±0.25% |

5.2.3 Forces and Moments on Components — None

Type and Location of Balance

Maximum Loads and Accuracy

6. Data

6.1 Accuracy

| | |
|---|---|
| 6.1.1 Pressure Coefficients | ±.002 |
| 6.1.2 Aerodynamic Coefficients | ± .002 on $C_P$, ± .001 on $C_L$,<br>± .0003 on $C_D$, ± .0007 on $C_M$ |
| 6.1.3 Boundary Layer and Wake Quantities | |
| 6.1.4 Repeatability | Note duplicate symbols on force data. Figure 7.5 - 7.7. |
| 6.1.5 Additional Remarks | |

6.2 Wall Interference Corrections — Not applied, but static pressure measured at 4 spanwise locations near the tunnel walls above and below the model to provide far-field boundary conditions for code correlations. (See Figures 7.4, 7.13 and Table III, V - IX )

6.3 Data Presentation

| | |
|---|---|
| 6.3.1 Aerodynamic Coefficients | See Figure 7.5 - 7.7. |
| 6.3.2 Surface Pressure Coefficients | See Figure 7.8 - 7.12, Table V - IX |

| | | |
|---|---|---|
| 6.3.3 | Flow Conditions | See Table IV |
| | - Aerodynamic coefficient data | M = .7, .75, .8, .84, .86, .88, .90, .92, .94<br>$\alpha$ = -2 to 5° |
| | - Pressure data | Wing Pressures<br>M = .70, .80, .85, .88, .90; $\alpha = 4^0$<br>Wind-Tunnel Wall Pressures<br>M = .70, .80, .85, .88, .90; $\alpha = 4°$ |
| 6.3.4 | Boundary Layer and/or Wake Data | None |
| 6.3.5 | Flow Conditions for Boundary Layer and/or Wake Data | None |
| 6.3.6 | Wall Interference Corrections Included? | No |
| 6.3.7 | Aeroelastic Corrections Included? | No |
| 6.3.8 | Other Corrections? | No |

## 7. References


1. Hinson, B. L., and Burdges, K. P., "Acquisition and Application of Transonic Wing and Far-Field Test Data for Three-Dimensional Computational Method Evaluation," AFOSR-TR-80-0421, March 1980.

2. Pounds, G. A., and Stanewsky, E., "The Compressible Flow Facility, Part 1: Design," Lockheed-Georgia Company ER 9219-1, October 1967.


## 8. List of Symbols

| | |
|---|---|
| AR | wing aspect ratio, $b^2/S$ |
| b | wing span |
| C | streamwise local chord of wing |
| $C_D$ | drag coefficient |
| $C_L$ | lift coefficient |
| $C_M$ | pitching-moment coefficient about quarter chord of MAC |
| $C_p$ | pressure coefficient |
| M | freestream Mach number |
| MAC | mean aerodynamic chord of wing |
| $R_N$ | Reynolds number based on freestream conditions and MAC |
| S | wing planform area |
| x | streamwise coordinate measured from wing leading edge |
| y | spanwise coordinate measured from plane of symmetry |
| z | coordinate normal to airfoil chord or tunnel center plane |
| $\alpha$ | angle of wing reference plane relative to tunnel axis |
| $\theta$ | wing section local incidence angle relative to WRP |
| $\lambda$ | wing taper ratio, $C_t/C_r$ |
| $\Lambda$ | wing sweep angle |
| $\eta$ | span station, y/(b/2), ETA |

| | |
|---|---|
| $\tau$ | wind tunnel wall porosity |

Subscripts:

| | |
|---|---|
| L | lower surface |
| LE | leading edge |
| M | measured |
| r,R | wing root |
| t | wing tip |
| TE | trailing edge |
| U | upper surface |

Abbreviations:

| | |
|---|---|
| CFWT | Lockheed Compressible Flow Wind Tunnel |
| WRP | wing reference plane |

TABLE I - WING B DESIGN ORDINATES

| | ROOT SECTION | | TIP SECTION | |
|---|---|---|---|---|
| X/C | $Z_U/C$ | $Z_L/C$ | $Z_U/C$ | $Z_L/C$ |
| .00000 | .00000 | .00000 | .00000 | .00000 |
| .00241 | .00617 | -.00528 | .00507 | -.00606 |
| .00961 | .01181 | -.00895 | .00972 | -.01066 |
| .02153 | .01649 | -.01198 | .01401 | -.01408 |
| .03806 | .01991 | -.01511 | .01770 | -.01691 |
| .05904 | .02268 | -.01839 | .02110 | -.01951 |
| .08427 | .02517 | -.02111 | .02421 | -.02161 |
| .11349 | .02737 | -.02333 | .02700 | -.02325 |
| .14645 | .02925 | -.02503 | .02949 | -.02439 |
| .18280 | .03075 | -.02618 | .03168 | -.02492 |
| .22221 | .03191 | -.02691 | .03360 | -.02498 |
| .26430 | .03277 | -.02705 | .03522 | -.02446 |
| .30866 | .03330 | -.02669 | .03654 | -.02344 |
| .35486 | .03346 | -.02582 | .03762 | -.02180 |
| .40245 | .03325 | -.02458 | .03847 | -.01967 |
| .45099 | .03258 | -.02287 | .03905 | -.01689 |
| .50000 | .03155 | -.02070 | .03933 | -.01361 |
| .54901 | .03013 | -.01768 | .03922 | -.00950 |
| .59755 | .02842 | -.01376 | .03882 | -.00396 |
| .64514 | .02639 | -.00985 | .03799 | .00042 |
| .69134 | .02417 | -.00615 | .03669 | .00474 |
| .73570 | .02178 | -.00316 | .03491 | .00814 |
| .77779 | .01925 | -.00109 | .03258 | .01020 |
| .81720 | .01660 | .00003 | .02962 | .01087 |
| .85355 | .01388 | .00043 | .02608 | .01026 |
| .88651 | .01116 | .00043 | .02211 | .00867 |
| .91573 | .00865 | .00032 | .01793 | .00651 |
| .94096 | .00644 | .00012 | .01379 | .00417 |
| .96194 | .00459 | -.00021 | .00991 | .00196 |
| .97847 | .00308 | -.00055 | .00674 | .00006 |
| .99039 | .00196 | -.00082 | .00445 | -.00138 |
| .99759 | .00130 | -.00102 | .00305 | -.00227 |
| 1.00000 | .00109 | -.00109 | .00259 | -.00257 |

TABLE II - PRESSURE ORIFICE MEASURED LOCATIONS

| | UPPER SURFACE | | | | |
|---|---|---|---|---|---|
| ETA | .216 | .4 | .6 | .8 | .95 |
| (X/C) | .0197 | .0208 | .0189 | .0187 | .0217 |
| | .0497 | .0503 | .0495 | .0483 | .0497 |
| | .0992 | .1003 | .0993 | .0989 | .1005 |
| | .1495 | .1507 | .1492 | .1483 | .1496 |
| | .1993 | .2001 | .1995 | .1995 | .1993 |
| | .2496 | .2509 | .2487 | .2490 | .2500 |
| | .2995 | .3002 | .2999 | .2982 | .3001 |
| | .3495 | .3504 | .3496 | .3495 | .3504 |
| | .3997 | .4009 | .3991 | .3994 | .4006 |
| | .4493 | .4502 | .4497 | .4493 | .4503 |
| | .4976 | .5001 | .4997 | .4995 | .5000 |
| | .5488 | .5501 | .5492 | .5485 | .5499 |
| | .5993 | .6001 | .5997 | .5985 | .5997 |
| | .6495 | .6503 | .6493 | .6486 | .6500 |
| | .6994 | .7004 | .6992 | .6995 | .7001 |
| | .7492 | .8005 | .7494 | .7489 | .7498 |
| | .7993 | .8500 | .7988 | .7987 | .8015 |
| | .8493 | .8997 | .8497 | .8990 | .8512 |
| | .8993 | .9510 | .9007 | .9509 | .9005 |
| | .9492 | 1.0000 | .9513 | 1.0000 | .9515 |
| | 1.0000 | | 1.0000 | | 1.0000 |
| | LOWER SURFACE | | | | |
| | .0503 | .0500 | .0520 | .0500 | .0521 |
| | .1013 | .1000 | .1012 | .0973 | .1012 |
| | .2008 | .2004 | .2005 | .1981 | .1992 |
| | .3012 | .2999 | .2999 | .2981 | .3010 |
| | .4011 | .3999 | .3999 | .3974 | .4003 |
| | .6012 | .4999 | .5003 | .4986 | .4997 |
| | .8010 | .5997 | .5990 | .5968 | .5992 |
| | .8998 | .6997 | .6995 | .6985 | .6992 |
| | 1.0000 | .8005 | .7994 | .7968 | .7980 |
| | | .9016 | .8933 | .8961 | .8916 |
| | | .9518 | .9480 | .9452 | .9548 |
| | | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

TABLE III - LOCATIONS OF FAR FIELD PRESSURE ORIFICE

| $Z/C_R$ / $Y/C_R$ | .851 / 0.0 | -.851 / 0.0 | .984 / .638 | .984 / 1.376 | .984 / 2.094 | -.984 / .592 | -.984 / 1.370 | -.984 / 2.088 |
|---|---|---|---|---|---|---|---|---|
| | $X/C_R$ | $X/C_R$ | $X/C_R$ | $X/C_R$ | $X/C_R$ | $X/C_R$ | $X/C_R$ | $X/C_R$ |
| | -1.848 | -1.848 | -1.841 | -1.841 | -1.841 | -1.841 | -1.841 | -1.841 |
| | -1.753 | -1.753 | -1.522 | -1.522 | -1.522 | -1.522 | -1.522 | -1.522 |
| | -1.392 | -1.392 | -1.203 | -1.203 | -1.203 | -1.203 | -1.203 | -1.203 |
| | -.671 | -.671 | -.883 | -.883 | -.883 | -.883 | -.883 | -.883 |
| | -.189 | -.189 | -.777 | -.777 | -.777 | -.777 | -.777 | -.777 |
| | .050 | .050 | -.670 | -.670 | -.670 | -.670 | -.670 | -.670 |
| | .289 | .289 | -.564 | -.564 | -.564 | -.564 | -.564 | -.564 |
| | .529 | .529 | -.457 | -.457 | -.457 | -.457 | -.457 | -.457 |
| | .769 | .769 | -.351 | -.351 | -.351 | -.351 | -.351 | -.351 |
| | 1.009 | 1.009 | -.245 | -.245 | -.245 | -.245 | -.245 | -.245 |
| | 1.249 | 1.249 | -.138 | -.138 | -.138 | -.138 | -.138 | -.138 |
| | 1.731 | 1.731 | -.032 | -.032 | -.032 | -.032 | -.032 | -.032 |
| | 2.211 | 2.211 | .075 | .075 | .075 | .075 | .075 | .075 |
| | 2.690 | 2.690 | .181 | .181 | .181 | .181 | .181 | .181 |
| | | | .287 | .287 | .287 | .287 | .287 | .287 |
| | | | .393 | .393 | .393 | .393 | .393 | .393 |
| | | | .500 | .500 | .500 | .500 | .500 | .500 |
| | | | .607 | .607 | .607 | .607 | .607 | .607 |
| | | | .713 | .713 | .713 | .713 | .713 | .713 |
| | | | .819 | .819 | .819 | .819 | .819 | .819 |
| | | | .925 | .925 | .925 | .925 | .925 | .925 |
| | | | 1.032 | 1.032 | 1.032 | 1.032 | 1.032 | 1.032 |
| | | | 1.139 | 1.139 | 1.139 | 1.139 | 1.139 | 1.139 |
| | | | 1.245 | 1.245 | 1.245 | 1.245 | 1.245 | 1.245 |
| | | | 1.351 | 1.351 | 1.351 | 1.351 | 1.351 | 1.351 |
| | | | 1.457 | 1.457 | 1.457 | 1.457 | 1.457 | 1.457 |
| | | | 1.564 | 1.564 | 1.564 | 1.564 | 1.564 | 1.564 |
| | | | 1.670 | 1.670 | 1.670 | 1.670 | 1.670 | 1.670 |
| | | | 1.989 | 1.989 | 1.989 | 1.989 | 1.989 | 1.989 |
| | | | 2.309 | 2.309 | 2.309 | 2.309 | 2.309 | 2.309 |
| | | | 2.628 | 2.628 | 2.628 | 2.628 | 2.628 | 2.628 |

TABLE IV - SUMMARY OF TEST CONDITIONS

| α \ M | .70 | .75 | .80 | .82 | .84 | .85 | .86 | .88 | .90 | .91 | .92 | .94 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -2 | ○ Ʊ ⊖ Ω □ △ | | | | | Ʊ ⊖ Ω | | | ○ Ʊ ⊖ Ω □ △ | | Ʊ ⊖ Ω | |
| -1 | ○ Ʊ ⊖ Ω □ △ | | | | | Ʊ ⊖ Ω | | | ○ Ʊ ⊖ Ω □ △ | | Ʊ ⊖ Ω | |
| 0 | ○ Ʊ ⊖ Ω □ △ | ○ | ○ | ○ | ○ | ○ Ʊ ⊖ Ω | ○ | ○ | ○ Ʊ ⊖ Ω □ △ | ○ | ○ Ʊ ⊖ Ω | ○ |
| 1 | ○ Ʊ ⊖ Ω □ △ | ○ | ○ | ○ | ○ | ○ Ʊ ⊖ Ω | ○ | ○ | ○ Ʊ ⊖ Ω □ △ | ○ | ○ Ʊ ⊖ Ω | ○ |
| 2 | ○ Ʊ ⊖ Ω □ △ | ○ | ○ | ○ | ○ | ○ Ʊ ⊖ Ω | ○ | ○ | ○ Ʊ ⊖ Ω □ △ | ○ | ○ Ʊ ⊖ Ω | ○ |
| 3 | ○ Ʊ ⊖ Ω □ △ | ○ | ○ | ○ | ○ | ○ Ʊ ⊖ Ω | ○ | ○ | ○ Ʊ ⊖ Ω □ △ | ○ | ○ Ʊ ⊖ Ω | ○ |
| 4 | ○ Ʊ ⊖ Ω □ △ | ○ Ʊ ⊖ Ω | ○ Ʊ ⊖ Ω | ○ Ʊ ⊖ Ω | ○ Ʊ ⊖ Ω | ○ Ʊ ⊖ Ω | ○ Ʊ ⊖ Ω | ○ Ʊ ⊖ Ω | ○ Ʊ ⊖ Ω □ △ | Ʊ ⊖ Ω | Ʊ ⊖ Ω | |
| 5 | ○ Ʊ ⊖ Ω □ △ | ○ | ○ | ○ | ○ | ○ Ʊ ⊖ Ω | ○ | ○ | ○ | | | |
| $C_L$ = .0 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | ○ | ○ |
| $C_L$ = .5 | ○ □ △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ □ △ | | | |

○ CLEAN WING, $\tau$ = 4%

□ CLEAN WING, $\tau$ = 3%

◇ CLEAN WING, $\tau$ = 5%

△ CLEAN WING, $\tau$ = 6%

Ʊ HIGH WING, $\tau$ = 4%

⊖ MID WING, $\tau$ = 4%

Ω LOW WING, $\tau$ = 4%

# TABLE V - TABLE OF MEASURED PRESSURE COEFFICIENTS, M = .70

RUN 5 MACH .7007 ALPHA 3.955 RN 10.41 $C_L$ 42866 $C_D$ .02656 $C_M$ -.05436

WING PRESSURE DATA

| STA .216 | | .400 | | .600 | | .800 | | .950 | |
|---|---|---|---|---|---|---|---|---|---|
| $c_l$ .42243 | | .44659 | | .45476 | | .41795 | | .29805 | |
| $c_m$ -.04838 | | -.05369 | | -.06079 | | -.07235 | | -.06813 | |
| X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ |
| | | | | UPPER SURFACE | | | | | |
| .0197 | -1.5330 | .0208 | -1.7256 | .0189 | -1.5859 | .0187 | -1.4017 | .0217 | -.8230 |
| .0497 | -.7852 | .0503 | -.8921 | .0495 | -.9127 | .0483 | -.7126 | .0497 | -.5589 |
| .0992 | -.5808 | .1003 | -.6013 | .0993 | -.5941 | .0989 | -.5503 | .1005 | -.4177 |
| .1495 | -.4872 | .1507 | -.5113 | .1492 | -.5073 | .1483 | -.4572 | .1496 | -.3410 |
| .1993 | -.4342 | .2001 | -.4513 | .1995 | -.4504 | .1995 | -.4004 | .1993 | -.3018 |
| .2496 | -.3960 | .2509 | -.4115 | .2487 | -.4068 | .2490 | -.3746 | .2500 | -.2627 |
| .2995 | -.3755 | .3002 | -.3799 | .2999 | -.3728 | .2982 | -.3399 | .3001 | -.2500 |
| .3495 | -.3190 | .3504 | -.3532 | .3496 | -.3471 | .3495 | -.3194 | .3504 | -.2326 |
| .3997 | -.2990 | .4009 | -.3154 | .3991 | -.3355 | .3994 | -.3036 | .4006 | -.2300 |
| .4493 | -.2921 | .4502 | -.3107 | .4497 | -.2984 | .4493 | -.2834 | .4503 | -.2029 |
| .4976 | -.2866 | .5001 | -.2882 | .4997 | -.2927 | .4995 | -.2723 | .5000 | -.2065 |
| .5488 | -.2764 | .5501 | -.2733 | .5492 | -.2806 | .5485 | -.2762 | .5499 | -.2054 |
| .5993 | -.2564 | .6001 | -.2615 | .5997 | -.2742 | .5985 | -.2725 | .5997 | -.2153 |
| .6495 | -.2340 | .6503 | -.2460 | .6493 | -.2691 | .6486 | -.2785 | .6500 | -.2247 |
| .6994 | -.2091 | .7004 | -.2270 | .6992 | -.2535 | .6995 | -.2727 | .7001 | -.2400 |
| .7492 | -.1945 | .8005 | -.1880 | .7494 | -.2384 | .7489 | -.2746 | .7498 | -.2740 |
| .7993 | -.1702 | .8500 | -.1437 | .7988 | -.2082 | .7987 | -.2618 | .8015 | -.2615 |
| .8493 | -.1306 | .8997 | -.0997 | .8497 | -.1732 | .8990 | -.1677 | .8512 | -.2447 |
| .8993 | -.0779 | .9510 | -.0343 | .9007 | -.1184 | .9509 | -.0919 | .9005 | -.1997 |
| .9492 | -.0249 | 1.0000 | .0152 | .9513 | -.0415 | 1.0000 | .0429 | .9515 | -.1163 |
| 1.0000 | .0638 | | | 1.0000 | .0286 | | | 1.0000 | -.0052 |
| | | | | LOWER SURFACE | | | | | |
| .0503 | .2587 | .0500 | .2442 | .0520 | .2086 | .0500 | .1418 | .0521 | -.0258 |
| .1013 | .1323 | .1000 | .1224 | .1012 | .1048 | .0973 | .0785 | .1012 | -.0718 |
| .2008 | .0435 | .2004 | .0428 | .2005 | .0443 | .1981 | -.0228 | .1992 | -.0973 |
| .3012 | .0126 | .2999 | .0129 | .2999 | -.0012 | .2981 | -.0391 | .3010 | -.0787 |
| .4011 | .0037 | .3999 | -.0015 | .3999 | .0048 | .3974 | -.0324 | .4003 | -.0615 |
| .6012 | .0686 | .4999 | -.0020 | .5003 | -.0034 | .4986 | -.0228 | .4997 | -.0433 |
| .8010 | .1956 | .5997 | .0833 | .5990 | .0865 | .5968 | .0725 | .5992 | .0552 |
| .8998 | .1474 | .6997 | .1656 | .6995 | .1716 | .6985 | .1693 | .6992 | .1395 |
| 1.0000 | .0638 | .8005 | .2051 | .7994 | .2135 | .7968 | .2270 | .7980 | .1787 |
| | | .9016 | .1672 | .8933 | .1883 | .8961 | .2042 | .8916 | .1647 |
| | | .9518 | .1302 | .9480 | .1498 | .9452 | .1430 | .9548 | .0725 |
| | | 1.0000 | .0152 | 1.0000 | .0286 | 1.0000 | .0429 | 1.0000 | -.0052 |

FAR FIELD MEASUREMENT

| $Z/C_R$ | .851 | -.851 | | .984 | .984 | .984 | -.984 | -.984 | -.984 |
|---|---|---|---|---|---|---|---|---|---|
| $Y/C_R$ | 0.0 | 0.0 | | .638 | 1.376 | 2.094 | .592 | 1.370 | 2.088 |
| $X/C_R$ | $C_p$ | $C_p$ | $X/C_R$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ |
| [illegible] | | .0292 | -1.841 | -.0095 | .0026 | .0197 | .0224 | .0147 | .0191 |
| [illegible] | .0047 | .0196 | -1.522 | .0051 | .0154 | .0053 | .0023 | .0128 | .0146 |
| [illegible] | .0062 | .0245 | -1.203 | -.0001 | .0089 | .0070 | .0107 | .0064 | .0132 |
| [illegible] | .0147 | -.0059 | -.883 | .0049 | .0036 | .0108 | .0126 | .0068 | .0093 |
| [illegible] | .0365 | -.0064 | -.777 | .0062 | .0066 | .0093 | .0150 | -.0017 | .0130 |
| [illegible] | .0456 | -.0357 | -.670 | -.0088 | .0134 | .0077 | .0122 | .0107 | .0109 |
| [illegible] | .0527 | -.0599 | -.564 | .0016 | .0085 | .0068 | .0213 | .0070 | .0079 |
| [illegible] | .0400 | -.0921 | -.457 | .0004 | .0098 | .0056 | .0194 | .0042 | .0120 |
| [illegible] | .0470 | -.0854 | [illegible] | .0015 | .0068 | .0064 | .0240 | .0106 | .0101 |
| [illegible] | .0318 | -.0797 | [illegible] | -.0056 | .0077 | .0081 | .0261 | .0135 | .0131 |
| [illegible] | .0463 | -.0701 | [illegible] | -.0043 | -.0027 | .0075 | .0257 | .0140 | .0107 |
| [illegible] | .0229 | -.0520 | [illegible] | -.0074 | -.0037 | .0052 | .0391 | .0128 | .0126 |
| [illegible] | -.0024 | -.0548 | [illegible] | -.0257 | -.0064 | .0065 | .0341 | .0136 | .0150 |
| [illegible] | -.0673 | -.0712 | [illegible] | -.0312 | -.0068 | .0028 | .0427 | .0169 | .0152 |
| | | | [illegible] | -.0329 | -.0116 | .0075 | .0478 | .0204 | .0159 |
| | | | [illegible] | -.0421 | .0022 | .0068 | .0503 | .0348 | .0138 |
| | | | [illegible] | -.0552 | -.0125 | -.0009 | .0527 | .0286 | .0172 |
| | | | [illegible] | -.0612 | -.0169 | .0044 | .0551 | .0308 | .0157 |
| | | | [illegible] | -.0651 | -.0214 | -.0035 | .0545 | .0355 | .0167 |
| | | | [illegible] | -.0661 | -.0241 | -.0047 | .0460 | .0375 | .0166 |
| | | | [illegible] | -.0695 | -.0310 | -.0058 | .0550 | .0347 | .0157 |
| | | | [illegible] | -.0671 | -.0319 | -.0084 | .0449 | .0336 | .0136 |
| | | | 1.139 | -.0604 | -.0327 | -.0071 | .0342 | .0328 | .0160 |
| | | | 1.245 | -.0546 | -.0323 | -.0012 | .0338 | .0256 | .0137 |
| | | | 1.351 | -.0495 | -.0272 | -.0035 | .0468 | .0307 | .0177 |
| | | | 1.457 | -.0159 | -.0297 | -.0060 | .0377 | .0253 | .0164 |
| | | | 1.564 | -.0291 | -.0269 | -.0008 | .0308 | .0238 | .0219 |
| | | | 1.670 | -.0383 | -.0307 | .0031 | .0246 | .0216 | .0169 |
| | | | [illegible] | -.0370 | -.0257 | .0010 | .0125 | .0123 | .0232 |
| | | | [illegible] | -.0334 | -.0187 | .0100 | -.0040 | .0070 | .0229 |
| | | | [illegible] | -.0353 | -.0239 | .0121 | -.0223 | -.0093 | .0247 |

TABLE VI - TABLE OF MEASURED PRESSURE COEFFICIENTS, M = .80

RUN 42 MACH .8011 ALPHA 3.939 REN 10.39 $C_L$ .44997 $C_D$ .02980 $C_M$ -.05832

WING PRESSURE DATA

| STA | .216 | | .400 | | .600 | | .800 | | .950 |
|---|---|---|---|---|---|---|---|---|---|
| $c_l$ | .45030 | | .48821 | | .49288 | | .44478 | | .32369 |
| $c_m$ | -.05112 | | -.05185 | | -.05948 | | -.07276 | | -.06984 |
| X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ |
| | | | | UPPER SURFACE | | | | | |
| .0197 | -1.1361 | .0208 | -1.2730 | .0189 | -1.1784 | .0187 | -1.0760 | .0217 | -.9655 |
| .0497 | -1.3051 | .0503 | -1.3665 | .0495 | -1.3372 | .0483 | -1.2482 | .0497 | -.8567 |
| .0992 | -.5798 | .1003 | -1.2070 | .0993 | -1.2132 | .0989 | -.7947 | .1005 | -.4596 |
| .1495 | -.5097 | .1507 | -.4705 | .1492 | -.4749 | .1483 | -.3632 | .1496 | -.3648 |
| .1993 | -.4567 | .2001 | -.4226 | .1995 | -.3761 | .1995 | -.3650 | .1993 | -.3098 |
| .2496 | -.4207 | .2509 | -.4011 | .2487 | -.3694 | .2490 | -.3718 | .2500 | -.2688 |
| .2995 | -.3952 | .3002 | -.3816 | .2999 | -.3546 | .2982 | -.3355 | .3001 | -.2487 |
| .3495 | -.3408 | .3504 | -.3584 | .3496 | -.3488 | .3495 | -.3262 | .3504 | -.2374 |
| .3997 | -.3284 | .4009 | -.3098 | .3991 | -.3334 | .3994 | -.2999 | .4006 | -.2312 |
| .4493 | -.3047 | .4502 | -.3210 | .4497 | -.3031 | .4493 | -.3020 | .4503 | -.2079 |
| .4976 | -.3093 | .5001 | -.3035 | .4997 | -.2990 | .4995 | -.2735 | .5000 | -.2091 |
| .5488 | -.2954 | .5501 | -.2884 | .5492 | -.2907 | .5485 | -.2836 | .5499 | -.2084 |
| .5993 | -.2709 | .6001 | -.2760 | .5997 | -.2865 | .5985 | -.2807 | .5997 | -.2186 |
| .6495 | -.2537 | .6503 | -.2570 | .6493 | -.2801 | .6486 | -.2879 | .6500 | -.2262 |
| .6994 | -.2260 | .7004 | -.2351 | .6992 | -.2677 | .6995 | -.2857 | .7001 | -.2463 |
| .7492 | -.2100 | .8005 | -.1883 | .7494 | -.2491 | .7489 | -.2876 | .7498 | -.2771 |
| .7993 | -.1737 | .8500 | -.1439 | .7988 | -.2144 | .7987 | -.2705 | .8015 | -.2669 |
| .8493 | -.1333 | .8997 | -.0877 | .8497 | -.1699 | .8990 | -.1573 | .8512 | -.2507 |
| .8993 | -.0693 | .9510 | -.0192 | .9007 | -.1054 | .9509 | -.0678 | .9005 | -.2042 |
| .9492 | -.0098 | 1.0000 | .0014 | .9513 | -.0255 | 1.0000 | .0638 | .9515 | -.1123 |
| 1.0000 | .0858 | | | 1.0000 | .0538 | | | 1.0000 | .0065 |
| | | | | LOWER SURFACE | | | | | |
| .0503 | .2466 | .0500 | .2220 | .0520 | .1875 | .0500 | .1183 | .0521 | -.0406 |
| .1013 | .1234 | .1000 | .1019 | .1012 | .0834 | .0973 | .0562 | .1012 | -.0925 |
| .2008 | .0340 | .2004 | .0279 | .2005 | .0312 | .1981 | -.0378 | .1992 | -.1183 |
| .3012 | .0013 | .2999 | .0022 | .2999 | -.0145 | .2981 | -.0531 | .3010 | -.0866 |
| .4011 | -.0085 | .3999 | -.0125 | .3999 | .0039 | .3974 | -.0385 | .4003 | -.0599 |
| .6012 | .0731 | .4999 | -.0080 | .5003 | -.0093 | .4986 | -.0285 | .4997 | -.0360 |
| .8010 | .2158 | .5997 | .0917 | .5990 | .0964 | .5968 | .0848 | .5992 | .0721 |
| .8998 | .1687 | .6997 | .1785 | .6995 | .1888 | .6985 | .1880 | .6992 | .1587 |
| 1.0000 | .0858 | .8005 | .2269 | .7994 | .2355 | .7968 | .2497 | .7980 | .2000 |
| | | .9016 | .1896 | .8933 | .2118 | .8961 | .2271 | .8916 | .1811 |
| | | .9518 | .1524 | .9480 | .1732 | .9452 | .1629 | .9548 | .0874 |
| | | 1.0000 | .0014 | 1.0000 | .0538 | 1.0000 | .0638 | 1.0000 | .0065 |

FAR FIELD MEASUREMENT

| $Z/C_R$ | .851 | -.851 |
|---|---|---|
| $Z/C_R$ | 0.0 | 0.0 |
| $X/C_R$ | $C_p$ | $C_p$ |
| -1.848 | | .0613 |
| -1.753 | .0189 | .0319 |
| -1.392 | .0135 | .0288 |
| -.671 | .0129 | -.0009 |
| -.189 | .0403 | .0042 |
| .050 | .0519 | -.0223 |
| .289 | .0588 | -.0646 |
| .529 | .0450 | -.1098 |
| .769 | .0574 | -.0996 |
| 1.009 | .0492 | -.0840 |
| 1.249 | .0684 | -.0707 |
| 1.731 | .0439 | -.0431 |
| 2.211 | .0226 | -.0350 |
| 2.690 | -.0406 | -.0323 |

| $Z/C_R$ | .984 | .984 | .984 | -.984 | -.984 | -.984 |
|---|---|---|---|---|---|---|
| $Z/C_R$ | .638 | 1.376 | 2.094 | .592 | 1.370 | 2.088 |
| $X/C_R$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ |
| -1.841 | -.0025 | -.0006 | .0159 | .0202 | .0128 | .0177 |
| -1.522 | .0081 | .0140 | .0053 | .0044 | .0138 | .0124 |
| -1.203 | -.0001 | .0116 | .0075 | .0125 | .0098 | .0137 |
| -.883 | .0055 | .0104 | .0115 | .0115 | .0103 | .0085 |
| -.777 | .0104 | .0095 | .0148 | .0173 | -.0020 | .0121 |
| -.670 | -.0028 | .0095 | .0091 | .0161 | .0105 | .0113 |
| -.564 | .0057 | .0077 | .0101 | .0233 | .0051 | .0099 |
| -.457 | .0049 | .0163 | .0069 | .0212 | .0036 | .0124 |
| -.351 | .0064 | .0082 | .0090 | .0265 | .0103 | .0121 |
| -.245 | .0053 | .0110 | .0111 | .0348 | .0130 | .0141 |
| -.138 | .0020 | .0029 | .0089 | .0308 | .0158 | .0129 |
| -.032 | -.0026 | -.0022 | .0134 | .0420 | .0182 | .0156 |
| .075 | -.0184 | .0045 | .0106 | .0428 | .0240 | .0180 |
| .181 | -.0229 | .0016 | .0059 | .0521 | .0249 | .0174 |
| .287 | -.0312 | -.0080 | .0082 | .0534 | .0279 | .0223 |
| .393 | -.0419 | .0043 | .0022 | .0587 | .0418 | .0166 |
| .500 | -.0558 | -.0108 | -.0012 | .0640 | .0355 | .0194 |
| .607 | -.0630 | -.0163 | -.0000 | .0678 | .0389 | .0198 |
| .713 | -.0690 | -.0234 | -.0003 | .0693 | .0433 | .0193 |
| .819 | -.0743 | -.0274 | -.0043 | .0590 | .0451 | .0200 |
| .925 | -.0778 | -.0329 | -.0030 | .0663 | .0442 | .0229 |
| 1.032 | -.0747 | -.0329 | -.0066 | .0556 | .0451 | .0229 |
| 1.139 | -.0661 | -.0332 | -.0049 | .0471 | .0434 | .0245 |
| 1.245 | -.0582 | -.0310 | -.0006 | .0451 | .0383 | .0227 |
| 1.351 | -.0511 | -.0260 | .0002 | .0586 | .0427 | .0267 |
| 1.457 | -.0174 | -.0260 | .0029 | .0520 | .0382 | .0306 |
| 1.564 | -.0244 | -.0210 | .0191 | .0494 | .0386 | .0318 |
| 1.670 | -.0275 | -.0252 | .0055 | .0473 | .0358 | .0259 |
| 1.989 | -.0240 | -.0163 | .0166 | .0348 | .0304 | .0443 |
| 2.309 | -.0177 | -.0006 | .0370 | .0198 | .0339 | .0543 |
| 2.628 | -.0203 | -.0062 | .0323 | -.0001 | .0157 | .0534 |

TABLE VII - TABLE OF MEASURED PRESSURE COEFFICIENTS, M = .85

RUN 16 MACH .8491 ALPHA 3.955 REN 10.16 $C_L$ .47339 $C_D$ .03272 $C_M$ -.06274

WING PRESSURE DATA

| STA | .216 | | .400 | | .600 | | .800 | | .950 |
|---|---|---|---|---|---|---|---|---|---|
| $c_l$ | .46131 | | .50760 | | .51620 | | .47617 | | .32740 |
| $c_m$ | -.05560 | | -.05429 | | -.05836 | | -.06986 | | -.07100 |
| X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ |
| UPPER SURFACE | | | | | | | | | |
| .0197 | -.9726 | .0208 | -1.0859 | .0189 | -.9935 | .0187 | -.9086 | .0217 | -.8409 |
| .0497 | -1.1344 | .0503 | -1.1977 | .0495 | -1.1559 | .0483 | -1.0776 | .0497 | -.9476 |
| .0992 | -.6005 | .1003 | -1.0739 | .0993 | -1.0623 | .0989 | -.9691 | .1005 | -.7983 |
| .1495 | -.5796 | .1507 | -1.0041 | .1492 | -1.0187 | .1483 | -.9513 | .1496 | -.3128 |
| .1993 | -.4986 | .2001 | -.5172 | .1995 | -.9598 | .1995 | -.8394 | .1993 | -.1624 |
| .2496 | -.4726 | .2509 | -.4731 | .2487 | -.4209 | .2490 | -.2818 | .2500 | -.2018 |
| .2995 | -.4560 | .3002 | -.4314 | .2999 | -.2986 | .2982 | -.2144 | .3001 | -.2160 |
| .3495 | -.4171 | .3504 | -.3400 | .3496 | -.2732 | .3495 | -.2588 | .3504 | -.2261 |
| .3997 | -.3353 | .4009 | -.3108 | .3991 | -.2788 | .3994 | -.2517 | .4006 | -.2147 |
| .4493 | -.3126 | .4502 | -.3112 | .4497 | -.2457 | .4493 | -.2370 | .4503 | -.1960 |
| .4976 | -.3102 | .5001 | -.2954 | .4997 | -.2624 | .4995 | -.2460 | .5000 | -.2011 |
| .5488 | -.3048 | .5501 | -.2821 | .5492 | -.2673 | .5485 | -.2678 | .5499 | -.2007 |
| .5993 | -.2849 | .6001 | -.2719 | .5997 | -.2713 | .5985 | -.2732 | .5997 | -.2138 |
| .6495 | -.2627 | .6503 | -.2572 | .6493 | -.2762 | .6486 | -.2851 | .6500 | -.2249 |
| .6994 | -.2296 | .7004 | -.2353 | .6992 | -.2628 | .6995 | -.2887 | .7001 | -.2488 |
| .7492 | -.2098 | .8005 | -.1871 | .7494 | -.2496 | .7489 | -.2934 | .7498 | -.2823 |
| .7993 | -.1746 | .8500 | -.1415 | .7988 | -.2142 | .7987 | -.2741 | .8015 | -.2740 |
| .8493 | -.1295 | .8997 | -.0799 | .8497 | -.1676 | .8990 | -.1502 | .8512 | -.2599 |
| .8993 | -.0606 | .9510 | -.0055 | .9007 | -.0962 | .9509 | -.0585 | .9005 | -.2107 |
| .9492 | .0031 | 1.0000 | .0322 | .9513 | -.0126 | 1.0000 | .0738 | .9515 | -.1126 |
| 1.0000 | .1029 | | | 1.0000 | .0644 | | | 1.0000 | .0199 |
| LOWER SURFACE | | | | | | | | | |
| .0503 | .2353 | .0500 | .2127 | .0520 | .1682 | .0500 | .0995 | .0521 | -.0556 |
| .1013 | .1260 | .1000 | .0957 | .1012 | .0733 | .0973 | .0525 | .1012 | -.1112 |
| .2008 | .0361 | .2004 | .0228 | .2005 | .0214 | .1981 | -.0485 | .1992 | -.1366 |
| .3012 | .0032 | .2999 | -.0045 | .2999 | -.0203 | .2981 | -.0605 | .3010 | -.0905 |
| .4011 | -.0105 | .3999 | -.0145 | .3999 | -.0048 | .3974 | -.0457 | .4003 | -.0578 |
| .6012 | .0743 | .4999 | -.0064 | .5003 | -.0095 | .4986 | -.0295 | .4997 | -.0335 |
| .8010 | .2295 | .5997 | .0969 | .5990 | .1015 | .5968 | .0932 | .5992 | .0838 |
| .8998 | .1840 | .6997 | .1924 | .6995 | .1999 | .6985 | .1997 | .6992 | .1702 |
| 1.0000 | .1029 | .8005 | .2409 | .7994 | .2496 | .7968 | .2635 | .7980 | .2116 |
| | | .9016 | .2059 | .8933 | .2292 | .8961 | .2442 | .8916 | .1963 |
| | | .9518 | .1702 | .9480 | .1903 | .9452 | .1816 | .9548 | .0972 |
| | | 1.0000 | .0322 | 1.0000 | .0644 | 1.0000 | .0738 | 1.0000 | .0199 |

FAR FIELD MEASUREMENT

| $Z/C_R$ | .851 | -.851 | | .984 | .984 | .984 | -.984 | -.984 | -.984 |
|---|---|---|---|---|---|---|---|---|---|
| $Y/C_R$ | 0.0 | 0.0 | | .638 | 1.376 | 2.094 | .592 | 1.370 | 2.088 |
| X/C | $C_p$ | $C_p$ | Y/$C_R$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ |
| -1.848 | | .0497 | -1.841 | .0055 | .0113 | .0203 | .0274 | .0205 | .0234 |
| -1.753 | .0182 | .0340 | -1.522 | .0127 | .0177 | .0182 | .0090 | .0181 | .0198 |
| -1.39[illegible] | .0233 | .0314 | -1.203 | .0087 | .0164 | .0177 | .0177 | .0138 | .0198 |
| -.671 | .0208 | .0083 | -.883 | .0114 | .0163 | .0187 | .0185 | .0152 | .0163 |
| [illegible] | .0534 | .0202 | -.777 | .0144 | .0212 | .0166 | .0208 | .0080 | .0190 |
| [illegible] | .0628 | -.0069 | -.670 | .0028 | .0217 | .0191 | .0215 | .0195 | .0198 |
| [illegible] | .0666 | -.0597 | -.564 | .0102 | .0196 | .0184 | .0271 | .0163 | .0161 |
| .5[illegible]9 | .0508 | -.1186 | -.457 | .0146 | .0168 | .0142 | .0305 | .0116 | .0194 |
| .769 | .0639 | -.1125 | -.351 | .0162 | .0160 | .0191 | .0352 | .0165 | .0202 |
| [illegible] | .0583 | -.0829 | -.245 | .0142 | .0128 | .0209 | .0429 | .0189 | .0227 |
| [illegible] | .0762 | -.0653 | -.138 | .0119 | .0149 | .0221 | .0397 | .0228 | .0212 |
| [illegible] | .0541 | -.0351 | [illegible] | .0112 | .0054 | .0193 | .0556 | .0250 | .0226 |
| [illegible] | .0303 | -.0294 | [illegible] | -.0092 | .0097 | .0199 | .0505 | .0308 | .0251 |
| [illegible] | -.0294 | -.0263 | [illegible] | -.0109 | .0077 | .0202 | .0648 | .0347 | .0278 |
| | | | [illegible] | -.0214 | .0052 | .0121 | .0656 | .0352 | .0282 |
| | | | [illegible] | -.0354 | .0101 | .0137 | .0707 | .0501 | .0273 |
| | | | [illegible] | -.0572 | -.0043 | .0073 | .0716 | .0462 | .0278 |
| | | | .607 | -.0696 | -.0130 | .0052 | .0750 | .0469 | .0262 |
| | | | .71[illegible] | -.0766 | -.0222 | .0066 | .0764 | .0512 | .0290 |
| | | | .819 | -.0768 | -.0292 | .0052 | .0722 | .0517 | .0282 |
| | | | .925 | -.0827 | -.0344 | .0008 | .0784 | .0521 | .0283 |
| | | | 1.03[illegible] | -.0762 | -.0365 | -.0080 | .0698 | .0512 | .0299 |
| | | | 1.139 | -.0687 | -.0355 | .0020 | .0578 | .0504 | .0292 |
| | | | 1.245 | -.0603 | -.0305 | .0031 | .0540 | .0470 | .0321 |
| | | | 1.351 | -.0524 | -.0233 | .0050 | .0649 | .0521 | .0352 |
| | | | 1.45[illegible] | -.0177 | -.0229 | .0088 | .0591 | .0466 | .0372 |
| | | | 1.564 | -.0233 | -.0189 | .0107 | .0569 | .0463 | .0394 |
| | | | 1.671 | -.0263 | -.0212 | .0162 | .0539 | .0436 | .0376 |
| | | | [illegible] | -.0196 | -.0082 | .0267 | .0440 | .0426 | .0539 |
| | | | [illegible] | -.0135 | .0041 | .0527 | .0281 | .0418 | .0716 |
| | | | [illegible] | -.0128 | .0053 | .0531 | .0101 | .0293 | .0722 |

TABLE VIII - TABLE OF MEASURED PRESSURE COEFFICIENTS, M = .88

RUN 65 MACH .8786 ALPHA 3.959 PLN 9.99 $C_L$ .49613 $C_D$ .03667 $C_M$ -.07633

WING PRESSURE DATA

| STA | .216 | | .400 | | .600 | | .800 | | .950 |
|---|---|---|---|---|---|---|---|---|---|
| $c_l$ | .47559 | | .52698 | | .53953 | | .48322 | | .35009 |
| $c_m$ | -.06627 | | -.06212 | | -.06123 | | -.06813 | | -.06889 |
| X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ |
| | | | | UPPER SURFACE | | | | | |
| .0197 | -.8583 | .0208 | -.9824 | .0189 | -.8839 | .0187 | -.8020 | .0217 | -.7416 |
| .0497 | -1.0381 | .0503 | -1.0809 | .0495 | -1.0392 | .0483 | -.9636 | .0497 | -.8452 |
| .0992 | -.4543 | .1003 | -.9747 | .0993 | -.9676 | .0989 | -.8772 | .1005 | -.7404 |
| .1495 | -.5314 | .1507 | -.9370 | .1492 | -.9300 | .1483 | -.8523 | .1496 | -.7659 |
| .1993 | -.4961 | .2001 | -.5773 | .1995 | -.8897 | .1995 | -.8288 | .1993 | -.7908 |
| .2496 | -.4715 | .2509 | -.4951 | .2487 | -.8762 | .2490 | -.8225 | .2500 | -.3741 |
| .2995 | -.4583 | .3002 | -.4822 | .2999 | -.5800 | .2982 | -.7949 | .3001 | -.0969 |
| .3495 | -.4350 | .3504 | -.4836 | .3496 | -.4611 | .3495 | -.3059 | .3504 | -.1026 |
| .3997 | -.4400 | .4009 | -.4361 | .3991 | -.3572 | .3994 | -.1578 | .4006 | -.1348 |
| .4493 | -.4252 | .4502 | -.4519 | .4497 | -.4378 | .4493 | -.1432 | .4503 | -.1108 |
| .4976 | -.4411 | .5001 | -.4523 | .4997 | -.2356 | .4995 | -.1131 | .5000 | -.1447 |
| .5488 | -.4521 | .5501 | -.4725 | .5492 | -.1905 | .5485 | -.1507 | .5499 | -.1662 |
| .5993 | -.4370 | .6001 | -.2214 | .5997 | -.2030 | .5985 | -.1968 | .5997 | -.1932 |
| .6495 | -.2495 | .6503 | -.2139 | .6493 | -.2284 | .6486 | -.2365 | .6500 | -.2110 |
| .6994 | -.2097 | .7004 | -.2180 | .6992 | -.2412 | .6995 | -.2723 | .7001 | -.2457 |
| .7492 | -.1975 | .8005 | -.1741 | .7494 | -.2291 | .7489 | -.2888 | .7498 | -.2862 |
| .7993 | -.1647 | .8500 | -.1275 | .7988 | -.2066 | .7987 | -.2784 | .8015 | -.2809 |
| .8493 | -.1193 | .8997 | -.0679 | .8497 | -.1582 | .8990 | -.1458 | .8512 | -.2751 |
| .8993 | -.0553 | .9510 | .0106 | .9007 | -.0848 | .9509 | -.0494 | .9005 | -.2250 |
| .9492 | .0142 | 1.0000 | .0555 | .9513 | .0022 | 1.0000 | .0927 | .9515 | -.1150 |
| 1.0000 | .1173 | | | 1.0000 | .0913 | | | 1.0000 | .0235 |
| | | | | LOWER SURFACE | | | | | |
| .0503 | .2409 | .0500 | .2134 | .0520 | .1486 | 500 | .0770 | .0521 | -.0862 |
| .1013 | .1245 | .1000 | .0861 | .1012 | .0614 | .0973 | .0301 | .1012 | -.1562 |
| .2008 | .0324 | .2004 | .0153 | .2005 | .0118 | .1981 | -.0633 | .1992 | -.1756 |
| .3012 | -.0008 | .2999 | -.0108 | .2999 | -.0289 | .2981 | -.0765 | .3010 | -.1065 |
| .4011 | -.0172 | .3999 | -.0231 | .3999 | -.0093 | .3974 | -.0578 | .4003 | -.0551 |
| .6012 | .0779 | .4999 | -.0109 | .5003 | -.0120 | .4986 | -.0348 | .4997 | -.0236 |
| .8010 | .2376 | .5997 | .0985 | .5990 | .1030 | .5968 | .0955 | .5992 | .0916 |
| .8998 | .1939 | .6997 | .1990 | .6995 | .2056 | .6985 | .2061 | .6992 | .1788 |
| 1.0000 | .1173 | .8005 | .2496 | .7994 | .2581 | .7968 | .2722 | .7980 | .2207 |
| | | .9016 | .2162 | .8933 | .2390 | .8961 | .2550 | .8916 | .2022 |
| | | .9518 | .1784 | .9480 | .2012 | .9452 | .1937 | .9548 | .1038 |
| | | 1.0000 | .0555 | 1.0000 | .0913 | 1.0000 | .0927 | 1.0000 | .0235 |

FAR FIELD MEASUREMENT

| $Z/C_R$ | .851 | -.851 |
|---|---|---|
| $Z/C_R$ | 0.0 | 0.0 |
| $X/C_R$ | $C_p$ | $C_p$ |
| -1.848 | | .0364 |
| -1.753 | .0212 | .0283 |
| -1.392 | .0230 | .0351 |
| - .671 | .0210 | .0096 |
| - .189 | .0556 | .0256 |
| .050 | .0707 | .0014 |
| .289 | .0746 | -.0542 |
| .529 | .0596 | -.1343 |
| .769 | .0726 | -.1345 |
| 1.009 | .0637 | -.0873 |
| 1.249 | .0807 | -.0676 |
| 1.731 | .0568 | -.0320 |
| 2.211 | .0334 | -.0273 |
| 2.690 | -.0233 | -.0223 |

| $Z/C_R$ | .984 | .984 | .984 | -.984 | -.984 | -.984 |
|---|---|---|---|---|---|---|
| $Z/C_R$ | .638 | 1.376 | 2.094 | .592 | 1.370 | 2.088 |
| $X/C_R$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ |
| -1.841 | .0067 | .0103 | .0151 | .0278 | .0252 | .0285 |
| -1.522 | .0163 | .0203 | .0125 | .0121 | .0208 | .0207 |
| -1.203 | .0090 | .0203 | .0095 | .0225 | .0158 | .0228 |
| - .883 | .0134 | .0224 | .0074 | .0193 | .0171 | .0151 |
| - .777 | .0160 | .0129 | .0156 | .0218 | .0078 | .0219 |
| - .670 | .0036 | .0289 | .0078 | .0208 | .0202 | .0188 |
| - .564 | .0153 | .0146 | .0183 | .0310 | .0160 | .0182 |
| - .457 | .0183 | .0151 | .0187 | .0320 | .0157 | .0227 |
| - .351 | .0189 | .0169 | .0143 | .0373 | .0217 | .0196 |
| - .245 | .0186 | .0181 | .0258 | .0447 | .0265 | .0263 |
| - .138 | .0174 | .0119 | .0158 | .0415 | .0295 | .0231 |
| - .032 | .0181 | .0067 | .0311 | .0580 | .0289 | .0268 |
| .075 | -.0008 | .0219 | .0077 | .0544 | .0332 | .0266 |
| .181 | .0005 | .0123 | .0198 | .0710 | .0371 | .0306 |
| .287 | -.0139 | -.0031 | .0096 | .0673 | .0378 | .0320 |
| .393 | -.0258 | .0167 | .0138 | .0772 | .0563 | .0321 |
| .500 | -.0533 | -.0018 | .0161 | .0767 | .0479 | .0293 |
| .607 | -.0728 | -.0106 | .0040 | .0796 | .0514 | .0301 |
| .713 | -.0859 | -.0270 | .0036 | .0818 | .0509 | .0312 |
| .819 | -.0921 | -.0338 | -.0061 | .0740 | .0555 | .0306 |
| .925 | -.0953 | -.0455 | -.0003 | .0811 | .0509 | .0293 |
| 1.032 | -.0856 | -.0440 | -.0161 | .0719 | .0540 | .0292 |
| 1.139 | -.0725 | -.0407 | -.0002 | .0637 | .0534 | .0324 |
| 1.245 | -.0605 | -.0383 | -.0041 | .0613 | .0462 | .0336 |
| 1.351 | -.0498 | -.0257 | -.0057 | .0742 | .0555 | .0340 |
| 1.457 | -.0147 | -.0264 | -.0017 | .0677 | .0480 | .0359 |
| 1.564 | -.0231 | -.0187 | .0083 | .0616 | .0486 | .0372 |
| 1.670 | -.0267 | -.0250 | .0112 | .0572 | .0428 | .0365 |
| 1.989 | -.0201 | -.0095 | .0121 | .0455 | .0441 | .0549 |
| 2.309 | -.0143 | .0058 | .0569 | .0299 | .0463 | .0779 |
| 2.628 | -.0095 | .0100 | .0523 | .0156 | .0362 | .0781 |

## TABLE IX - TABLE OF MEASURED PRESSURE COEFFICIENTS, M = .90

RUN 29 MACH .9001 ALPHA 3.896 RN 10.40 $C_L$ .50003 $C_D$ .03772 $C_M$ -.08433

WING PRESSURE DATA

| STA | .216 | | .400 | | .600 | | .800 | | .950 | |
|---|---|---|---|---|---|---|---|---|---|---|
| $c_l$ | .48138 | | .52195 | | .54609 | | .51830 | | .35401 | |
| $c_m$ | -.07263 | | -.06872 | | -.06981 | | -.07794 | | -.06974 | |
| | X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ | X/C | $C_p$ |
| UPPER SURFACE | | | | | | | | | | |
| | .0197 | -.7967 | .0208 | -.9006 | .0189 | -.8095 | .0187 | -.7160 | .0217 | -.6515 |
| | .0497 | -.9552 | .0503 | -1.0056 | .0495 | -.9520 | .0483 | -.8738 | .0497 | -.7487 |
| | .0992 | -.5105 | .1003 | -.9047 | .0993 | -.8894 | .0989 | -.7926 | .1005 | -.6429 |
| | .1495 | -.5229 | .1507 | -.8621 | .1492 | -.8537 | .1483 | -.7729 | .1496 | -.6898 |
| | .1993 | -.4868 | .2001 | -.5583 | .1995 | -.8189 | .1995 | -.7567 | .1993 | -.7249 |
| | .2496 | -.4564 | .2509 | -.4870 | .2487 | -.8238 | .2490 | -.7665 | .2500 | -.7474 |
| | .2995 | -.4477 | .3002 | -.4720 | .2999 | -.6597 | .2982 | -.7382 | .3001 | -.6505 |
| | .3495 | -.4212 | .3504 | -.4714 | .3496 | -.4612 | .3495 | -.7352 | .3504 | -.1821 |
| | .3997 | -.4280 | .4009 | -.4349 | .3991 | -.4534 | .3994 | -.7127 | .4006 | -.0692 |
| | .4493 | -.4189 | .4502 | -.4528 | .4497 | -.4428 | .4493 | -.6335 | .4503 | -.0637 |
| | .4976 | -.4346 | .5001 | -.4528 | .4997 | -.4479 | .4995 | -.2818 | .5000 | -.0625 |
| | .5488 | -.4404 | .5501 | -.4518 | .5492 | -.4518 | .5485 | -.1315 | .5499 | -.0920 |
| | .5993 | -.4598 | .6001 | -.4927 | .5997 | -.4723 | .5985 | -.1121 | .5997 | -.1363 |
| | .6495 | -.4463 | .6503 | -.5150 | .6493 | -.1876 | .6486 | -.1459 | .6500 | -.1695 |
| | .6994 | -.4032 | .7004 | -.2004 | .6992 | -.1535 | .6995 | -.2071 | .7001 | -.2262 |
| | .7492 | -.2026 | .8005 | -.1193 | .7494 | -.1758 | .7489 | -.2512 | .7498 | -.2768 |
| | .7993 | -.1449 | .8500 | -.0975 | .7988 | -.1722 | .7987 | -.2691 | .8015 | -.2832 |
| | .8493 | -.1032 | .8997 | -.0490 | .8497 | -.1401 | .8990 | -.1414 | .8512 | -.2782 |
| | .8993 | -.0360 | .9510 | .0290 | .9007 | -.0742 | .9509 | -.0359 | .9005 | -.2291 |
| | .9492 | .0281 | 1.0000 | .0425 | .9513 | .0202 | 1.0000 | .0976 | .9515 | -.1096 |
| | 1.0000 | .1248 | | | 1.0000 | .1033 | | | 1.0000 | .0257 |
| LOWER SURFACE | | | | | | | | | | |
| | .0503 | .2411 | .0500 | .1837 | .0520 | .1271 | .0500 | .0471 | .0521 | -.1209 |
| | .1013 | .1175 | .1000 | .0719 | .1012 | .0403 | .0973 | .0049 | .1012 | -.1790 |
| | .2008 | .0245 | .2004 | .0011 | .2005 | -.0061 | .1981 | -.0854 | .1992 | -.2210 |
| | .3012 | -.0115 | .2999 | -.0252 | .2999 | -.0441 | .2981 | -.0954 | .3010 | -.1320 |
| | .4011 | -.0307 | .3999 | -.0333 | .3999 | -.0253 | .3974 | -.0708 | .4003 | -.0728 |
| | .6012 | .0717 | .4999 | -.0223 | .5003 | -.0218 | .4986 | -.0452 | .4997 | -.0234 |
| | .8010 | .2385 | .5997 | .0968 | .5990 | .1014 | .5968 | .0953 | .5992 | .0969 |
| | .8998 | .1977 | .6997 | .1998 | .6995 | .2073 | .6985 | .2089 | .6992 | .1864 |
| | 1.0000 | .1248 | .8005 | .2538 | .7994 | .2624 | .7968 | .2770 | .7980 | .2280 |
| | | | .9016 | .2203 | .8933 | .2438 | .8961 | .2621 | .8916 | .2075 |
| | | | .9518 | .1861 | .9480 | .2079 | .9452 | .2024 | .9548 | .1148 |
| | | | 1.0000 | .0425 | 1.0000 | .1033 | 1.0000 | .0976 | 1.0000 | .0257 |

FAR FIELD MEASUREMENT

| $Z/C_R$ | .851 | -.851 |
|---|---|---|
| $Y/C_R$ | 0.0 | 0.0 |
| $X/C_R$ | $C_p$ | $C_p$ |
| -1.848 | | .0471 |
| -1.753 | .0209 | .0284 |
| -1.392 | .0194 | .0322 |
| -.671 | .0197 | .0107 |
| -.189 | .0569 | .0322 |
| .050 | .0745 | .0120 |
| .289 | .0765 | -.0413 |
| .529 | .0588 | -.1306 |
| .769 | .0729 | -.1590 |
| 1.009 | .0684 | -.0957 |
| 1.249 | .0854 | -.0661 |
| 1.731 | .0604 | -.0364 |
| 2.211 | .0360 | -.0269 |
| 2.690 | -.0266 | -.0197 |

| $Z/C_R$ | .984 | .984 | .984 | -.984 | -.984 | -.984 |
|---|---|---|---|---|---|---|
| $Y/C_R$ | .638 | 1.376 | 2.094 | .592 | 1.370 | 2.088 |
| $X/C_R$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ | $C_p$ |
| -1.841 | .0087 | .0114 | .0293 | .0322 | .0323 | |
| -1.522 | .0168 | .0216 | .0219 | .0127 | .0222 | |
| -1.203 | .0082 | .0195 | .0236 | .0183 | .0217 | |
| -.883 | .0145 | .0223 | .0231 | .0191 | .0193 | |
| -.777 | .0181 | .0227 | .0195 | .0227 | .0198 | |
| -.670 | .0062 | .0233 | .0209 | .0223 | .0209 | |
| -.564 | .0138 | .0280 | .0294 | .0271 | .0200 | |
| -.457 | .0197 | .0239 | .0197 | .0321 | .0219 | |
| -.351 | .0222 | .0245 | .0229 | .0374 | .0221 | |
| -.245 | .0211 | .0303 | .0264 | .0441 | .0249 | |
| -.138 | .0230 | .0232 | .0243 | .0451 | .0254 | |
| -.032 | .0242 | .0207 | .0240 | .0614 | .0272 | |
| .075 | .0049 | .0240 | .0268 | .0563 | .0308 | |
| .181 | .0045 | .0219 | .0248 | .0703 | .0318 | |
| .287 | -.0043 | .0098 | .0192 | .0726 | .0342 | |
| .393 | -.0224 | .0254 | .0188 | .0742 | .0307 | |
| .500 | -.0476 | .0043 | .0126 | .0764 | .0313 | |
| .607 | -.0702 | -.0078 | .0115 | .0784 | .0310 | |
| .713 | -.0900 | -.0211 | .0054 | .0802 | .0302 | |
| .819 | -.1007 | -.0375 | .0026 | .0752 | .0309 | |
| .925 | -.1077 | -.0492 | .0009 | .0816 | .0314 | |
| 1.032 | -.0947 | -.0497 | -.0049 | .0739 | .0309 | |
| 1.139 | -.0785 | -.0474 | -.0041 | .0654 | .0294 | |
| 1.245 | -.0642 | -.0406 | .0021 | .0642 | .0324 | |
| 1.351 | -.0527 | -.0304 | .0018 | .0765 | .0331 | |
| 1.457 | -.0139 | -.0266 | .0022 | .0695 | .0334 | |
| 1.564 | -.0204 | -.0210 | .0155 | .0664 | .0378 | |
| 1.670 | -.0249 | -.0235 | .0111 | .0610 | .0353 | |
| 1.989 | -.0186 | -.0103 | .0226 | .0502 | .0535 | |
| 2.309 | -.0121 | .0066 | .0571 | .0336 | .0767 | |
| 2.628 | -.0116 | .0080 | .0617 | .0161 | .0862 | |

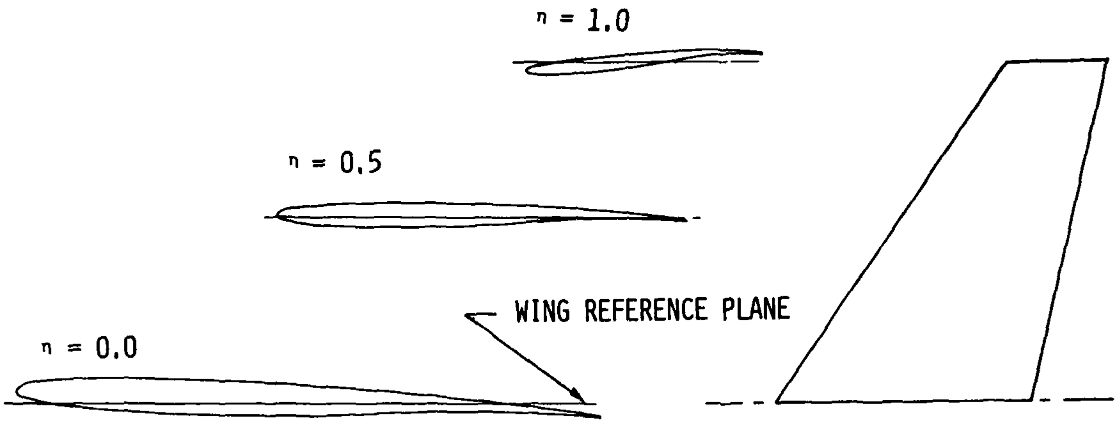



Figure 7.1 - Wing Geometry

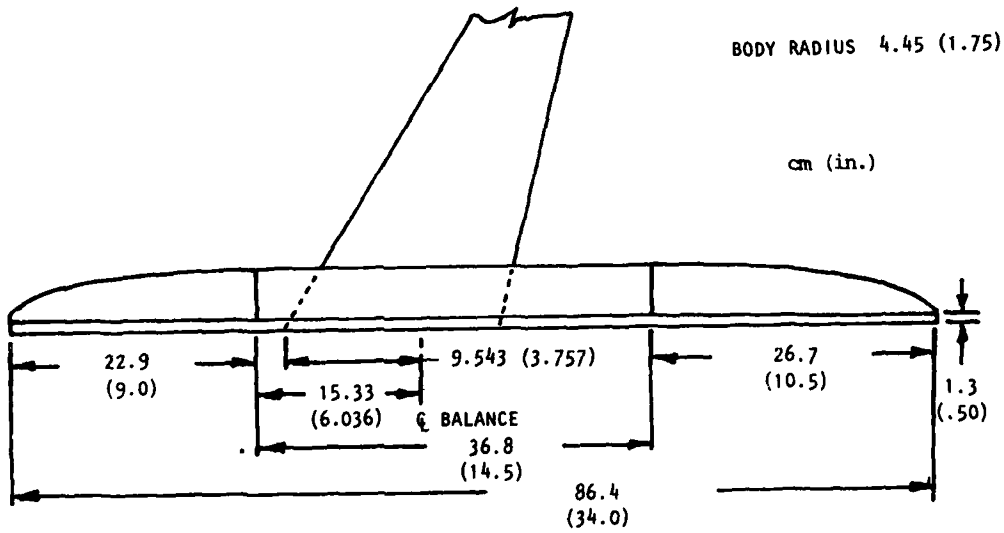



Figure 7.2 - Wing-Body Geometry

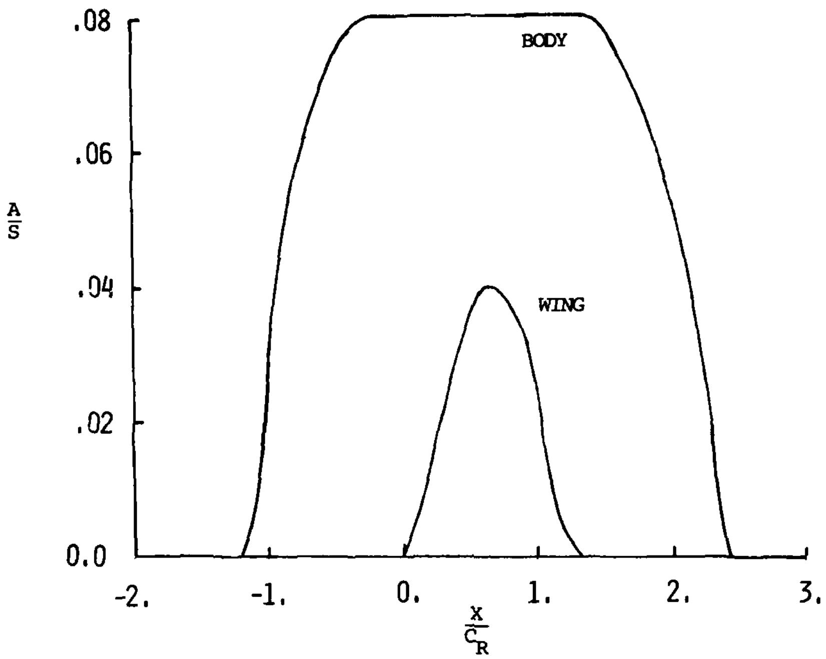



Figure 7.3 - Model Area Distribution

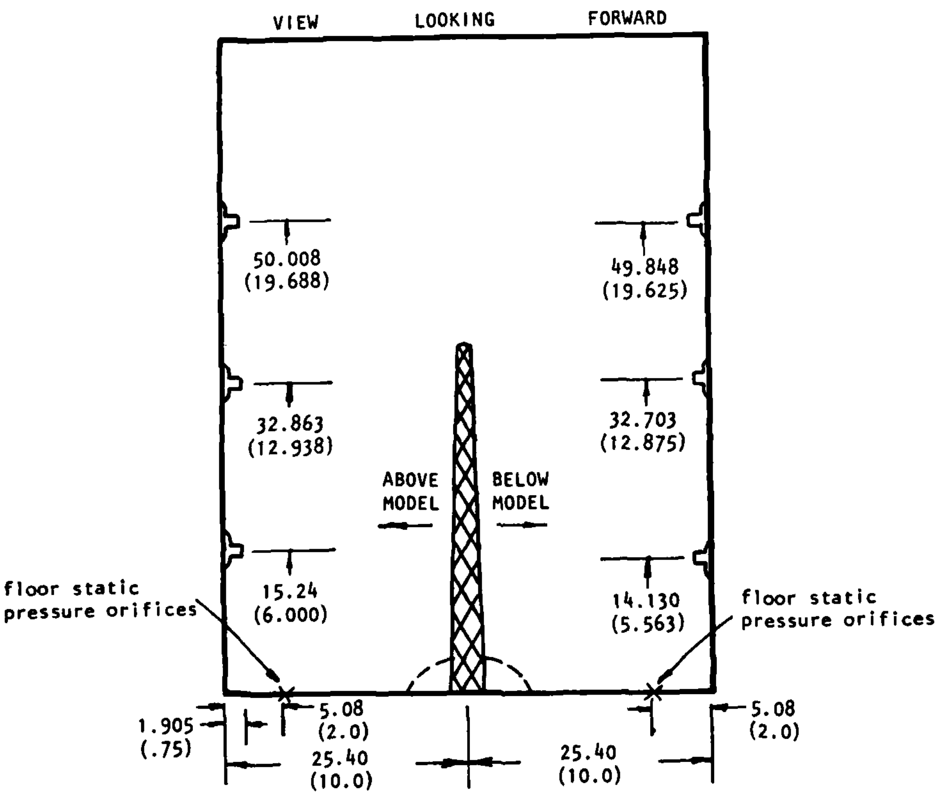



Figure 7.4 - Far Field Pressure Rail Location - cm (in.)

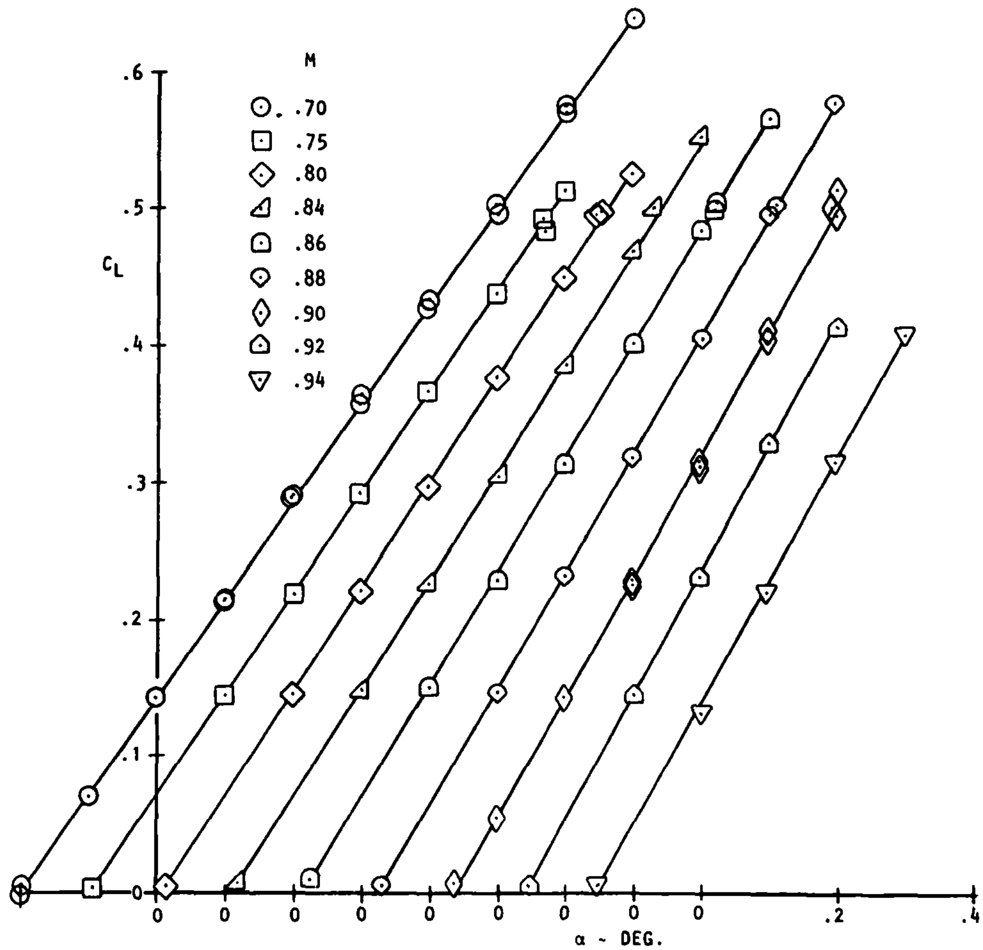



Figure 7.5 - Summary of Lift

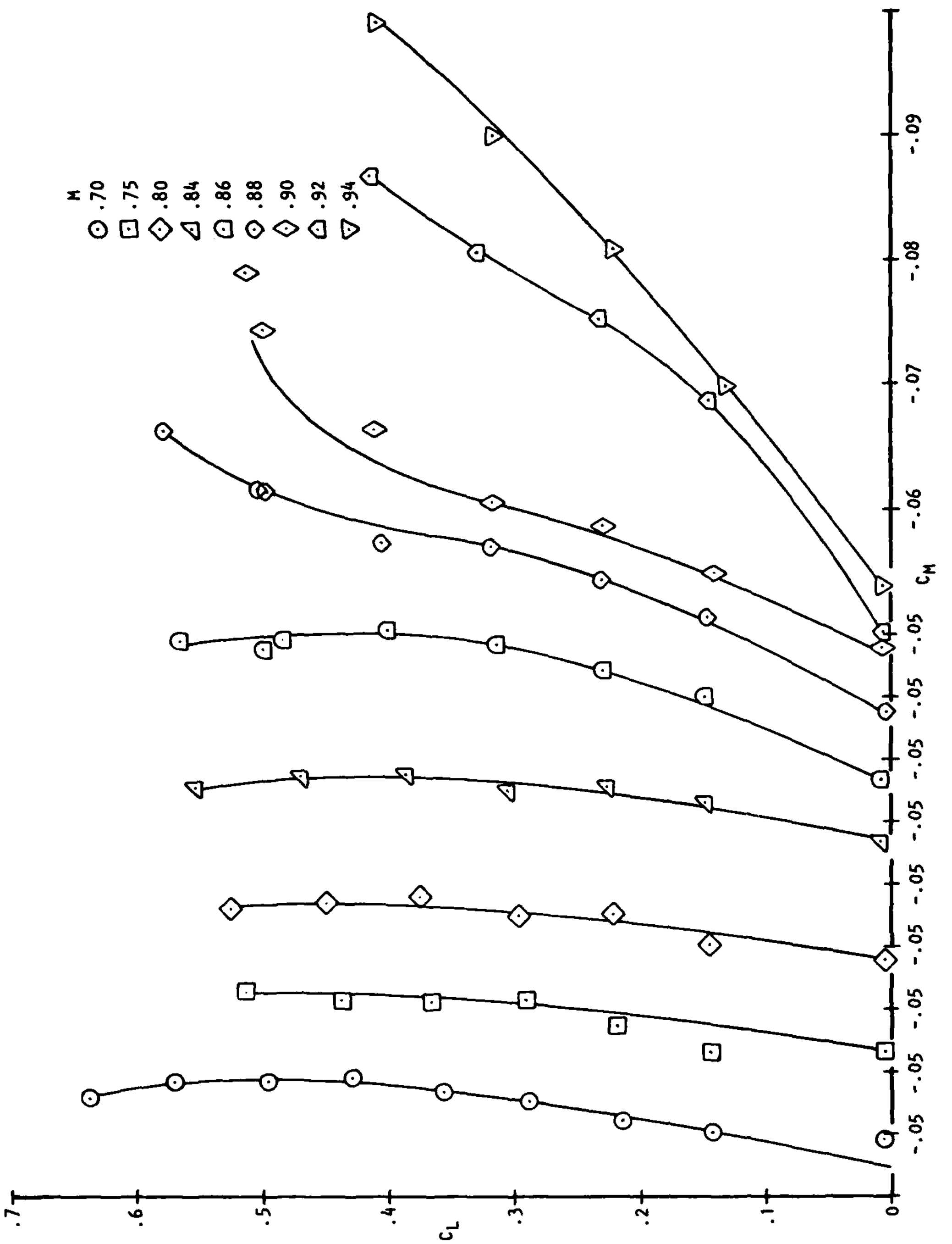



*Figure 7.6 -* Summary of Pitching Moment

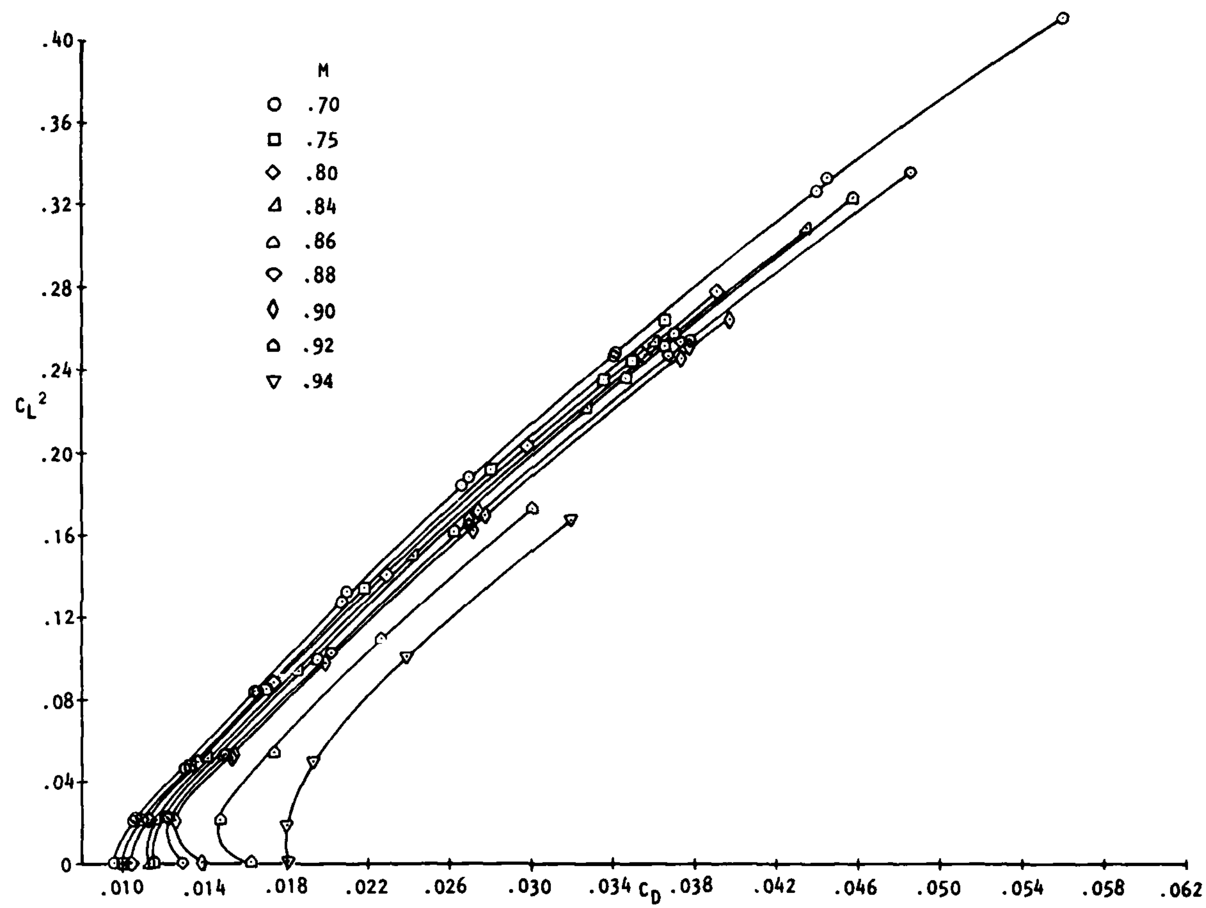



Figure 7.7 - Summary of Drag Data

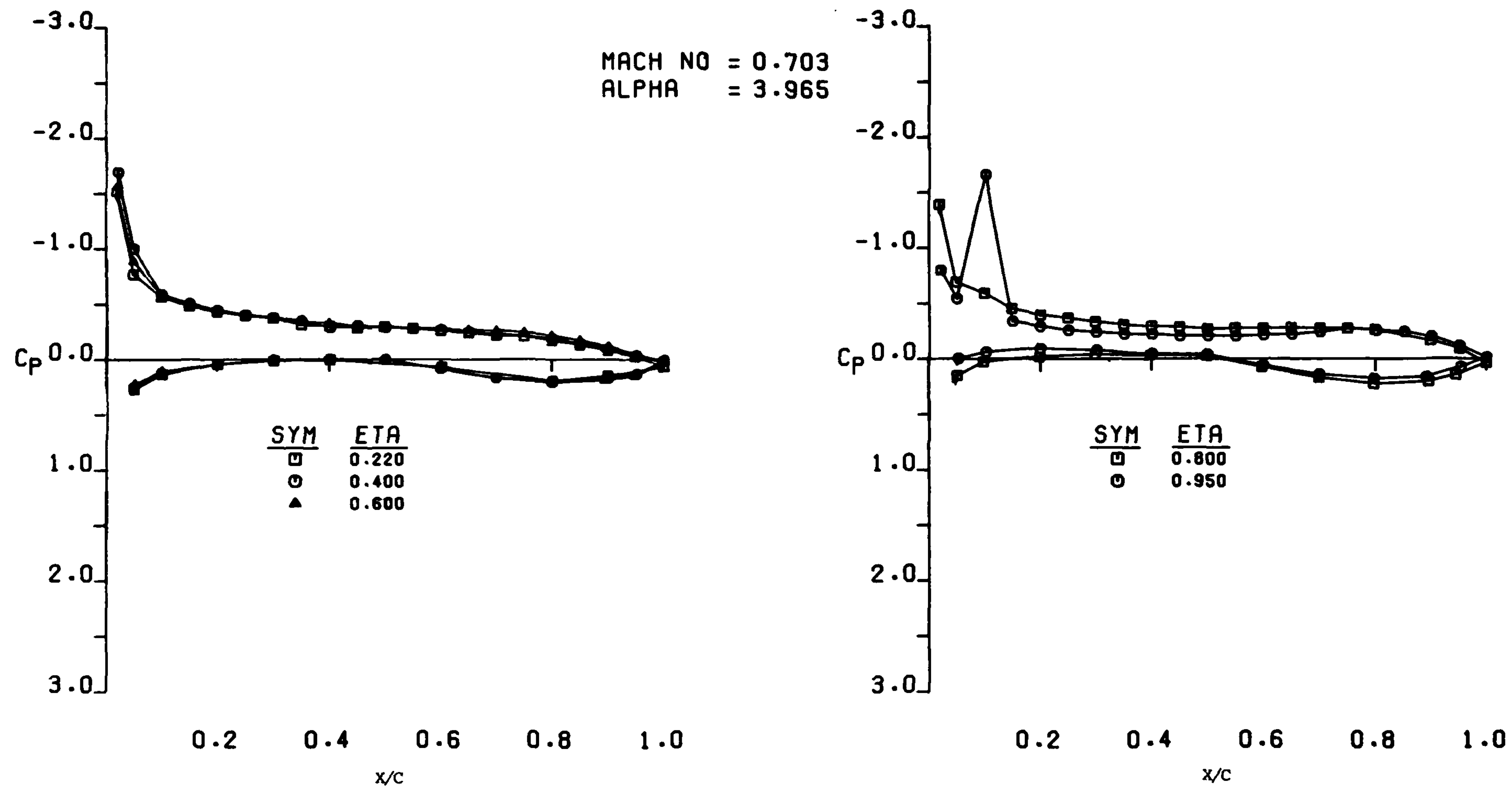



Figure 7.8 - Wing Pressure Data for M = .70

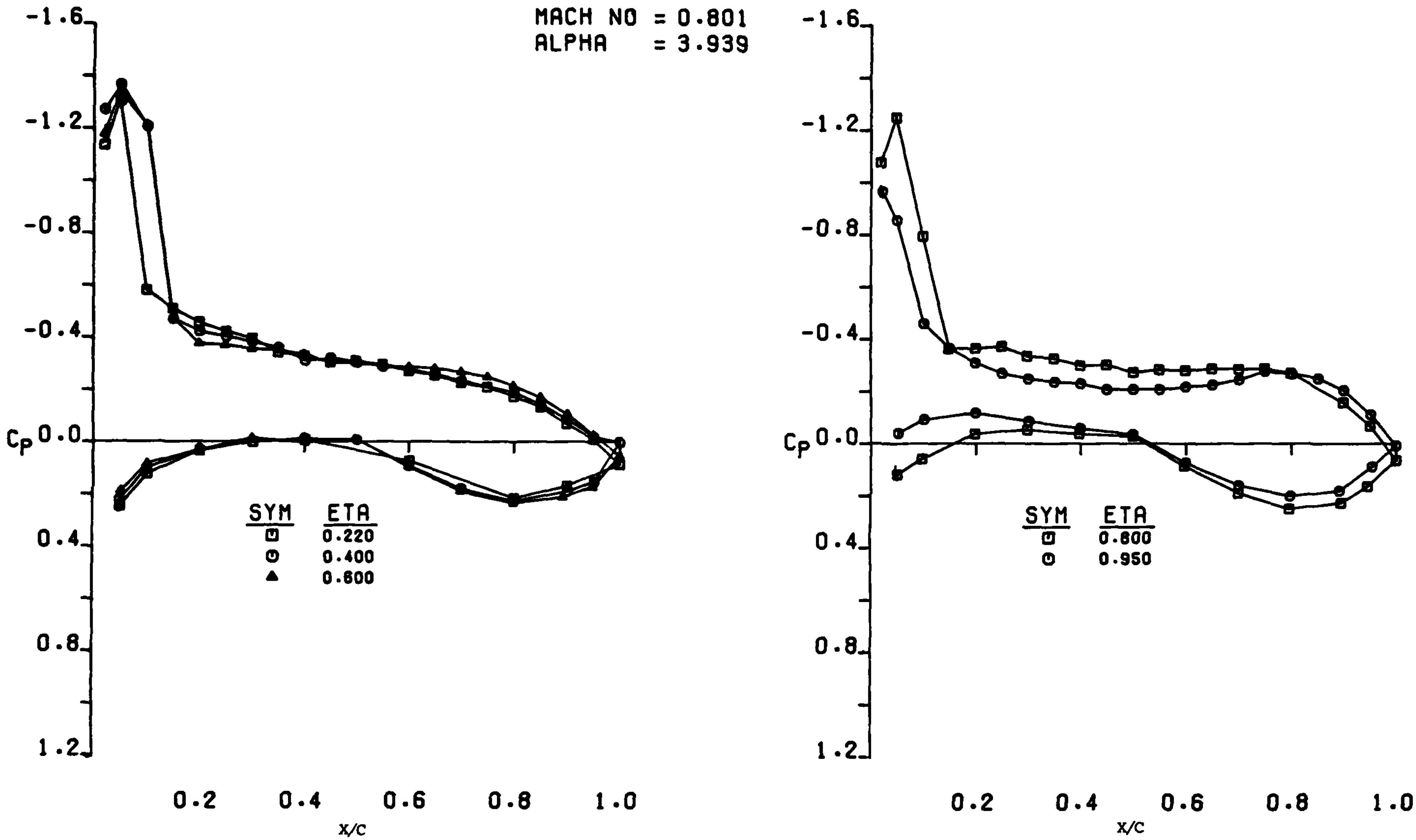



Figure 7.9 - Wing Pressure Data for M = .80

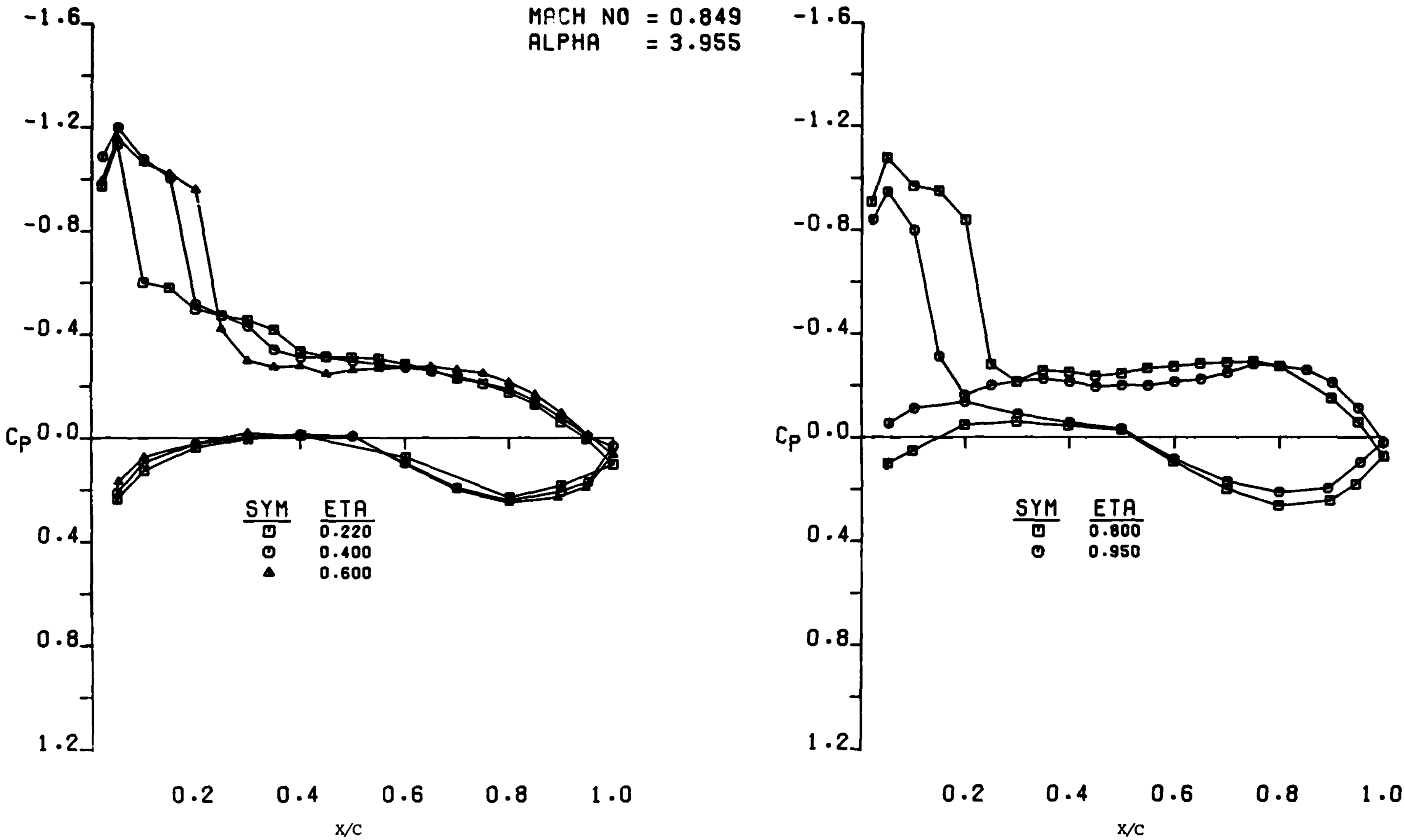



Figure 7.10 - Wing Pressure Data for M = .85

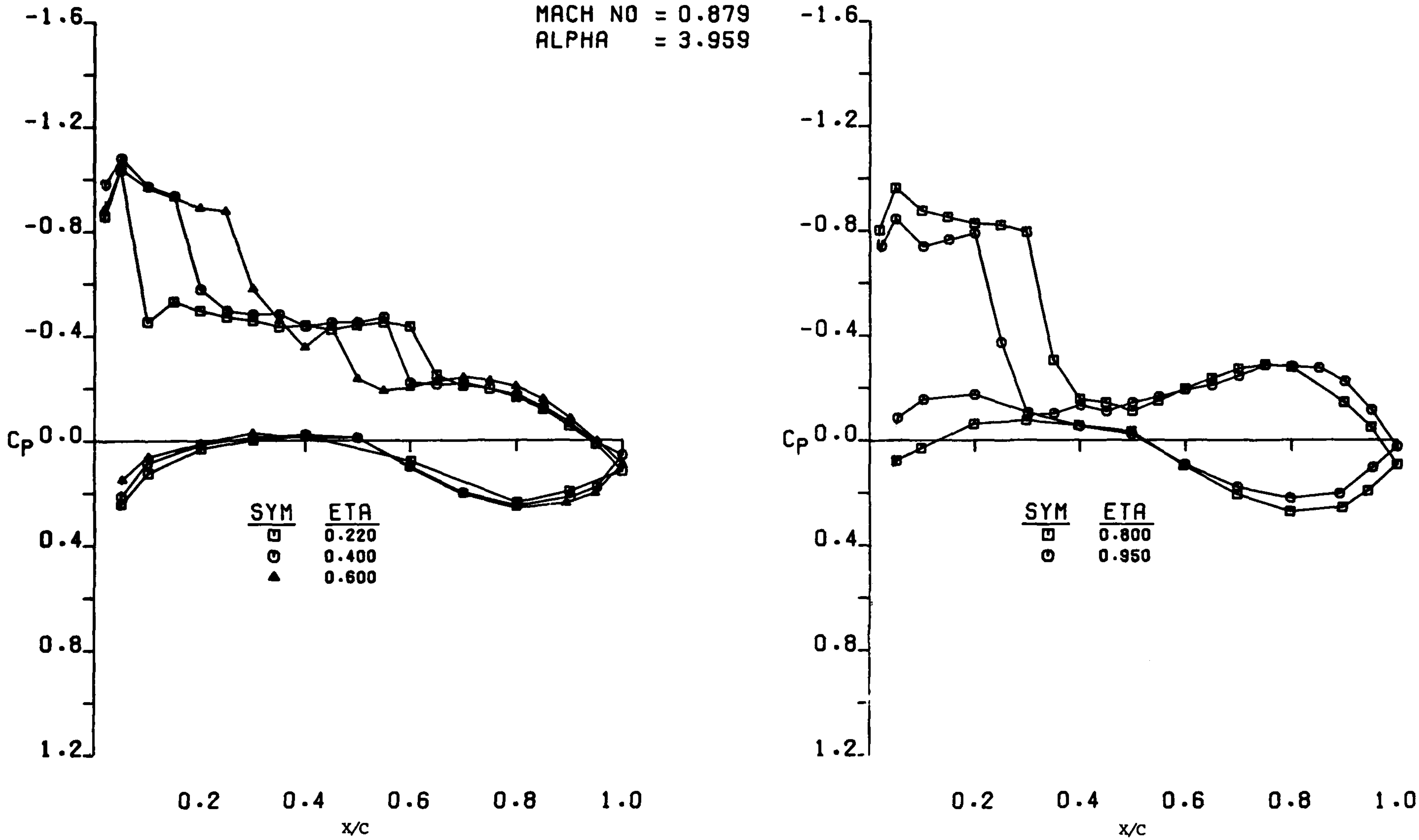



Figure 7.11 - Wing Pressure Data for M = .88

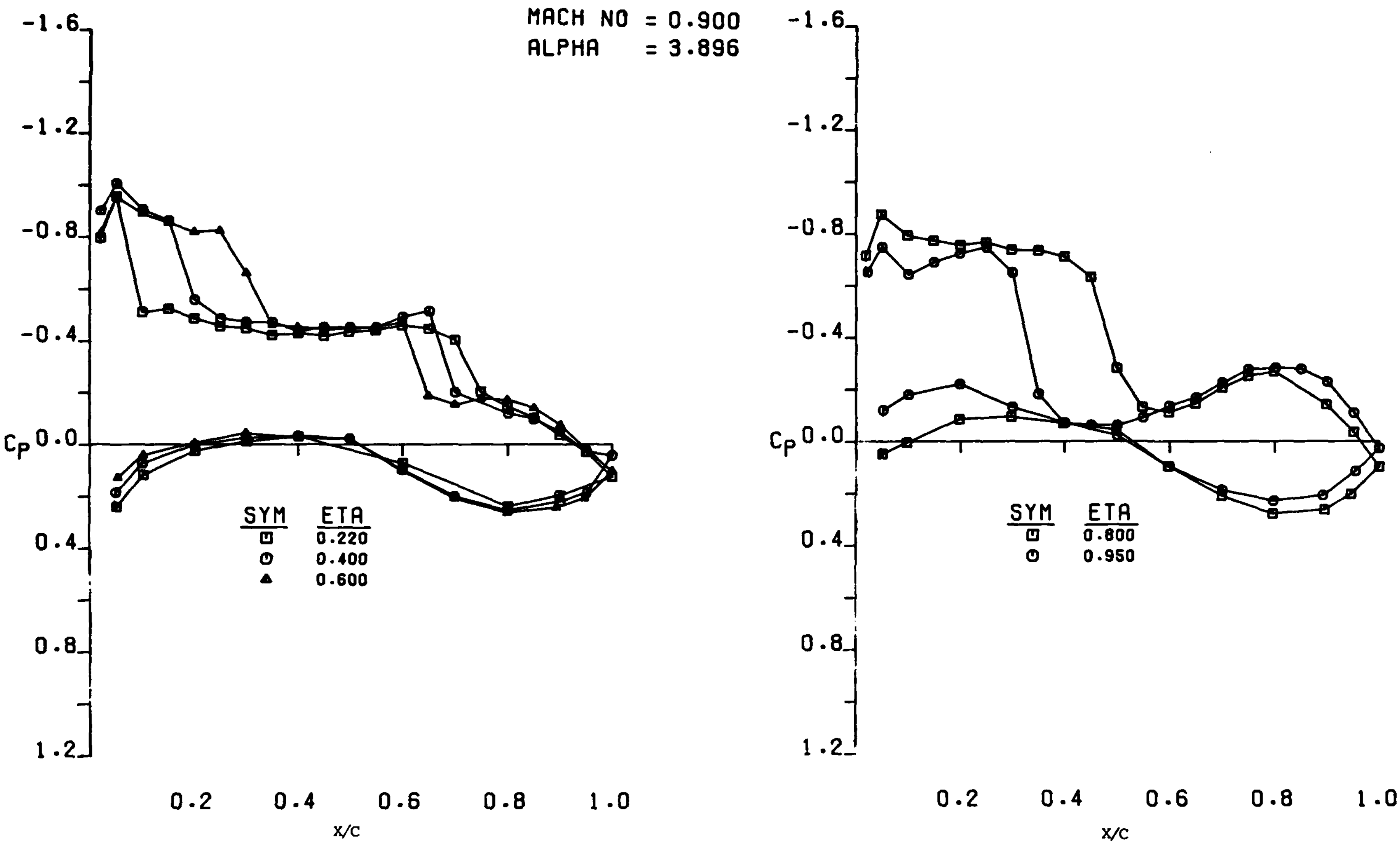
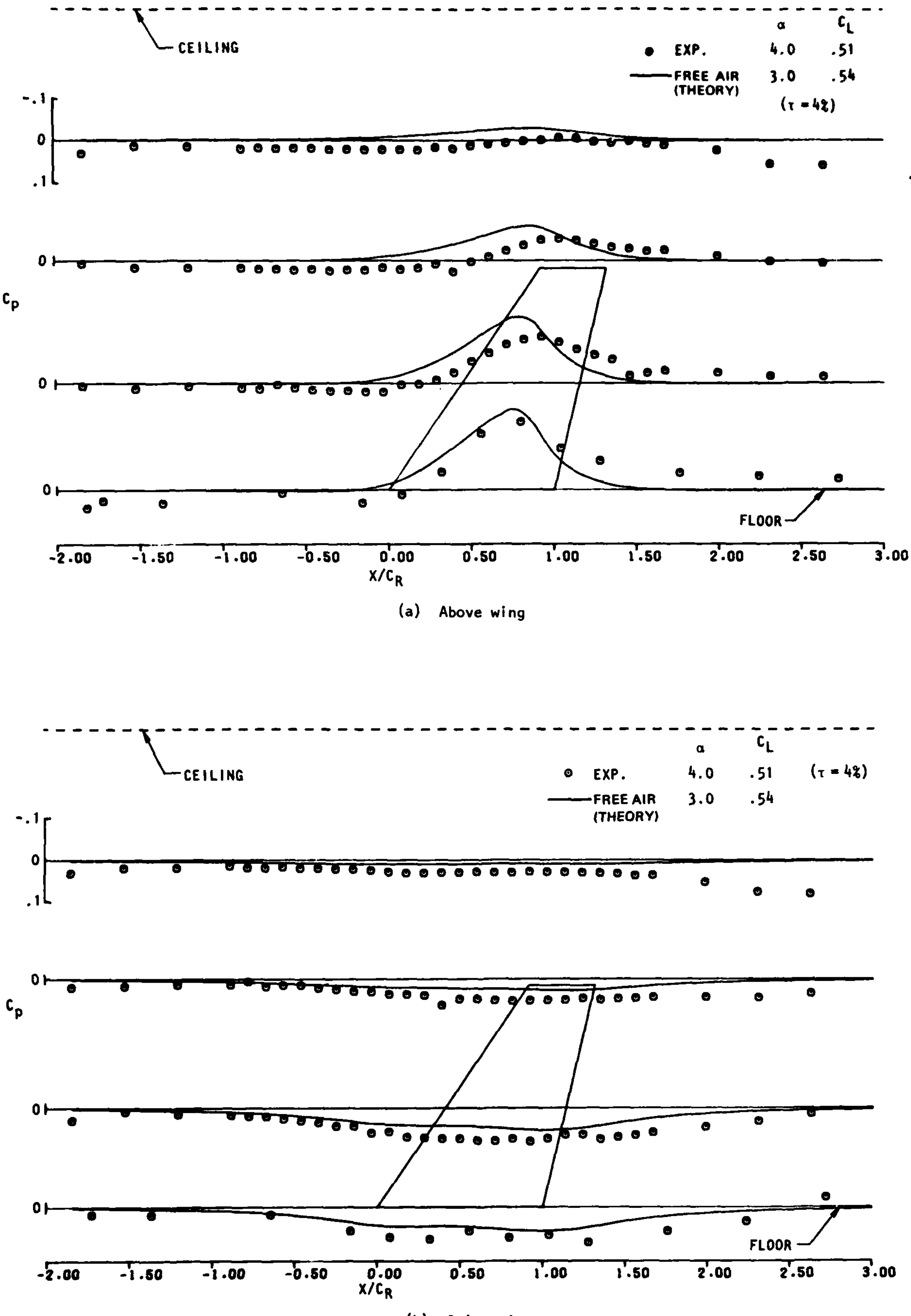



Figure 7.12 - Wing Pressure Data for M = .90




(a) Above wing



(b) Below wing

Figure 7.13 - Far Field Pressure Measurements for M = .90

# 8. PRESSURE DISTRIBUTIONS MEASURED ON RESEARCH WING M100 MOUNTED ON AN AXISYMMETRIC BODY

by

M P Carr and K C Pallister
Aircraft Research Association Limited
Manton Lane, Bedford MK41 7PF, UK

## 8.1 INTRODUCTION

This contribution contains selected data from measurements of surface pressure distributions on a research wing in the ARA 9ft x 8ft transonic wind tunnel. Tabulated data are given for an incidence range at constant Mach number and a Mach number range at approximately constant lift coefficient. Overall force measurements for the same test conditions as the presented pressures are also given.

## 8.2 DATA SET

### 1 General Description

| | |
|---|---|
| 1.1 Model Designation or Name | M100 |
| 1.2 Model Type (eg *Full Span Wing-Body, Semi-Span Wing*) | Full span wing-body |
| 1.3 Design Requirements/Conditions | Transport wing research model |
| 1.4 Additional Remarks | M100 was a civil transport research wing design mounted on a simple axisymmetric fuselage. The design was not orientated to any specific project but geometric constraints were applied commensurate with a practical aircraft design. The model was given a nominal scale of 1:23. |

### 2 Model Geometry

#### 2.1 Wing Data

| | |
|---|---|
| 2.1.1 Wing Planform | Straight wing with leading and trailing edge kinks, see Figure 8.1 |
| 2.1.2 Aspect Ratio | 9.02 |
| 2.1.3 Leading-Edge Sweep | 40° inboard, 34.4° outboard |
| 2.1.4 Trailing-Edge Sweep | 6.6° inboard, 26.3° outboard |
| 2.1.5 Taper Ratio | 0.2243 (tip chord/root chord at fuselage side) |
| 2.1.6 Twist | 4° root, -1° tip. (Included in ordinates of Table 1). |
| 2.1.7 Aerodynamic Mean Chord<br>Standard Mean Chord | 0.245 m<br>0.202 m |
| 2.1.8 Span or Semispan | 1.811 m span |
| 2.1.9 Number of Airfoil Sections used to Define Wing | 17 sections were used to design the wing but 82 sections were specified for model manufacture. 28 points on each surface defined the section at each spanwise station. |
| 2.1.10 Spanwise Location of Reference Section and Section Coordinates (Note if Ordinates are Design or Actual Measured Values) | Design ordinates for 17 sections plus a model centre line section are listed in Table 8.1. |
| 2.1.11 Lofting Procedure between Reference Sections | Piecewise cubics were used to interpolate between the design chordwise ordinates. |
| 2.1.12 Form of Wing-Body Fillet, Strakes | No leading edge fillet. Small flat sided fillet in the junction between the fuselage and wing upper surface. This fillet extended a relatively short distance downstream of the wing trailing edge. There were no fillets on the wing lower surface. |
| 2.1.13 Form of Wing Tip | Straight |

| | | |
|---|---|---|
| 2.2 | Body Data (Detail Description of Body Geometry) | Axisymmetric fuselage with tangent ogive nose and rear body. See Figure 8.1. |
| 2.3 | Wing-Body Combination | |
| 2.3.1 | Relative Body Diameter (Average Body Diameter at Wing Location Divided by Wing Span) | 0.11 |
| 2.3.2 | Relative Vertical Location of Wing (Height above or below Body Axis Divided by Average Body Radius at Wing Location) | -0.44 (see Figure 8.1) |
| 2.3.3 | Wing Setting Angle | 0° |
| 2.3.4 | Dihedral | 5° |
| 2.4 | Cross Sectional Area Development | See Figure 8.2 and Table 8.2 |
| 2.5 | Fabrication Tolerances/Waviness | ±0.05 mm |
| 2.6 | Additional Remarks | Nil |
| 3 | Wind Tunnel | |
| 3.1 | Designation | ARA 9ft x 8ft TWT |
| 3.2 | Type of Tunnel | |
| 3.2.1 | Continuous or Blowdown. Indicate Minimum Run Time if Applicable | Continuous |
| 3.2.2 | Stagnation Pressure | 0.8 to 1.2 bar |
| 3.2.3 | Stagnation Temperature | Up to 323 K |
| 3.3 | Test Section | |
| 3.3.1 | Shape of Test Section | Rectangular |
| 3.3.2 | Size of Test Section (Width, Height, Length) | 2.74 m x 2.44 m x 3.66 m |
| 3.3.3 | Type of Test Section, Closed, Open, Slotted, Perforated | Perforated |
| | Open Area Ratio (Give Range if Variable) | 22% |
| | Slot/Hole Geometry (eg 30-Degree Slanted Holes) | Normal holes vented into large plenum chamber |
| | Treatment of Sidewall Boundary Layer | |
| | Full span models ) Half model testing) | Tunnel has capability for full and half span model testing |
| 3.4 | Flow Field (Empty Test Section) | |
| 3.4.1 | Reference Static Pressure | Plenum chamber |
| 3.4.2 | Flow Angularity | Up to +0.15° in vicinity of model. (This is mainly due to the working section flow being horizontal and the roof set at +0.3° to allow for the boundary layer growth in the working section). |
| 3.4.3 | Mach Number Distribution | $\Delta M = \pm 0.002$ (See Reference 1). |
| 3.4.4 | Pressure Gradient | Insignificant over the length of the current model (see Reference 1) |
| 3.4.5 | Turbulence/Noise Level | - |
| 3.4.6 | Sidewall Boundary Layer | - |
| 3.5 | Freestream Mach number (or Velocity) | |
| 3.5.1 | Range | 0.3 to 1.4 |
| 3.5.2 | Pressures used to Determine Mach Number (eg Settling Chamber Total Pressure and Plenum Chamber Pressure) | Settling chamber total pressure (with a small correction applied), and plenum chamber static pressure |

| | |
|---|---|
| 3.5.3 Accuracy of Mach Number Determination ($\Delta M$) | $\Delta M = \pm 0.001$ |
| 3.5.4 Maximum Mach Number Variation in x, y, z - Direction (Empty Tunnel; Specify at what Mach Number) | Streamwise variation of $\Delta M = \pm 0.002$ over Mach number range. |
| Maximum Variation of Flow Direction | - |
| Maximum Mach Number Variation During a Traverse | $\Delta M = \pm 0.001$ |
| 3.6 Reynolds Number Range | |
| 3.6.1 Unit Reynolds Number Range (Give Range at Representative Mach Numbers: 1/m) | M = 0.40 R/m = $8.5 \times 10^6$ ±20%<br>0.80 $13.0 \times 10^6$ ±20%<br>1.40 $14.8 \times 10^6$ ±20% |
| 3.6.2 Means of Varying Reynolds Number (eg by Pressurisation) | Pressurisation (= ±0.2 bar) |
| 3.7 Temperature Range of Dewpoint. Can Temperature be Controlled? | Most runs made at 300 to 320 K stagnation temperature. Temperature and dewpoint both controlled. Dewpoint temperature 250°K for supersonic running. |
| 3.8 Model Attitudes | |
| 3.8.1 Angle of Attack, Yaw, Roll | Incidence -10° to 22° with straight sting, Roll ±180° |
| 3.8.2 Accuracy in Determining Angles | Incidence ±0.01°<br>Roll ±0.1° |
| 3.9 Organisation Operating the Tunnel and Location of Tunnel | Aircraft Research Association Limited<br>Manton Lane, Bedford, England |
| 3.10 Who is to be Contacted for Additional Information | Chief Aerodynamicist, ARA |
| 3.11 Literature Concerning this Facility | Reference 1<br>Reference 2 |
| 3.12 Additional Remarks | Nil |
| 4 <u>Tests</u> | |
| 4.1 Type of Tests | Surface pressures, overall force and moment measurements, surface oil flow visualisation and RMS wing root bending moments |
| 4.2 Wing Span or Semispan to Tunnel Width | $\frac{\text{Wing span}}{\text{Tunnel width}} = 0.66$ |
| 4.3 Test Conditions | |
| 4.3.1 Angle of Attack | -4° to +3° |
| 4.3.2 Mach Number | 0.50 to 0.93 |
| 4.3.3 Dynamic Pressure | Approx 14,000 to 35,000 $N/m^2$ |
| 4.3.4 Reynolds Number | $R_{\bar{c}} \approx 3.2 \times 10^6$ |
| 4.3.5 Stagnation Temperature | 300 K |
| 4.4 Transition | |
| 4.4.1 Free or Fixed | Fixed |
| 4.4.2 Position of Free Transition | N/A |
| 4.4.3 Position of Fixed Transition, Width of Strips, Size and Type of Roughness | See Figure 8.3<br>Width: 1.27 mm normal to leading edge.<br>Ballotini set in a thin film of Araldite<br>Diameters 0.102 to 0.127 mm and 0.089 to 0.102 mm |
| 4.4.4 Were Checks made to Determine if Transition Occurred at Trip Locations | Yes (acenaphthene sublimation) |

4.5 Wing Bending or Torsion Under Load

| | |
|---|---|
| 4.5.1 Describe any Aeroelastic Measurements Made During Tests | RMS wing root bending moment |
| 4.5.2 Describe Results of Any Bench Calibrations | Measurements on a similar model have indicated maximum aeroelastic wing tip deflection and twist of about +25 mm and 0.25° nose down respectively, (relative to the wing root). |

| | |
|---|---|
| 4.6 Were Different Sized Models Used in Wind-Tunnel Investigations. If so, Indicate Sizes | No |
| 4.7 Areas and Lengths Used to Form Coefficients | Area : $\underline{\underline{S}} = 0.367\ m^2$<br>Chord : $\bar{\bar{c}} = 0.245$ m |
| 4.8 References on Tests | None |
| 4.9 Related Reports | None |

5 <u>Instrumentation</u>

5.1 Surface Pressure Measurements

| | |
|---|---|
| 5.1.1 Pressure Orifices in Wing. Locations and Number on Upper and Lower Surfaces | The locations of the wing pressure orifices are listed in Table 8.3. |
| 5.1.2 Pressure Orifices on Fuselage. Location and Number | N/A |
| 5.1.3 Pressure Orifices on Components. Give Component and Orifice Location | None |
| 5.1.4 Geometry of Orifices | Round holes 0.6 mm diameter, 0.4 mm near trailing edge |
| 5.1.5 Type of Pressure Transducer and Scanning Devices Used. Indicate Range and Accuracy). | Druck differential pressure transducers, modular 'S' type Scanivalves. Range ±0.8 bar. (Wind tunnel plenum pressure was applied to the reference side of the differential transducers diaphragm) |

5.2 Force Measurements

| | |
|---|---|
| 5.2.1 Type and Location of Balance | ARA 2¼" 6 component internal strain-gauge balance |

5.2.2 Forces and Moments that can be Measured, Maximum Loads and Calibration Accuracy for Balance of 5.2.1

| | Maximum load | Average absolute error |
|---|---|---|
| Normal force | ±7100 N | ±8.0 N |
| Axial force | ± 670 N | ±0.5 N |
| Side force | ±1500 N | ±6.0 N |
| Pitching moment | ± 750 Nm | ±0.4 Nm |
| Rolling moment | ± 240 Nm | ±0.5 Nm |
| Yawing moment | ± 200 Nm | ±0.7 Nm |

| | |
|---|---|
| 5.2.3 Forces and Moments on Components | None |
| Type and Location of Balance | N/A |
| Maximum Loads and Accuracy | N/A |

5.3 Boundary Layer and Flow-Field Measurements

| | |
|---|---|
| 5.3.1 Boundary-Layer Probe Type, Position and Drive Mechanism | No |
| 5.3.2 Probe Dimension Relative to Boundary-Layer Thickness | N/A |
| 5.3.3 Laser-Doppler Velocimeter. Give Description of Apparatus and Accuracy | No |
| 5.3.4 Method and/or Instrument Used to Determine Boundary-Layer Transition | Acenaphthene sublimation tests |
| 5.3.5 Describe any Downstream Rakes or Probes Used. Reason for Use | None |

| | |
|---|---|
| 5.4 Surface Flow Visualisation | |
| 5.4.1 Indicate Method Used to Determine | |
| - Streamline pattern | Oil flows |
| - *Boundary-layer transition* | *Acenaphthene* sublimation |
| 5.4.2 Accuracy of Method | N/A |
| 5.5 Skin Friction Measurements | None |
| 5.5.1 Type of Instrument | N/A |
| 5.5.2 Geometry and Accuracy of Instrument | N/A |
| 5.5.3 Locations Where Probe Used | N/A |
| 5.6 Simulation of Exhaust Jet | No |
| 5.6.1 Describe Ducting of Air | N/A |
| 5.7 Additional Remarks | Nil |

## 6 Data

| | |
|---|---|
| 6.1 Accuracy | |
| 6.1.1 Pressure Coefficients | $C_p$ ±0.002 |
| 6.1.2 Aerodynamic Coefficients | $C_L$ ±0.002, $C_D$ ±0.0002 (absolute accuracy)<br>$C_L$ ±0.001, $C_D$ ±0.00015 (during a given test series if drag is a prime objective) |
| 6.1.3 Boundary Layer and Wake Quantities | N/A |
| 6.1.4 Repeatability | $C_L$ ±0.001 at condition below the lift break<br>$C_D$ ±0.00005 at conditions below the steep drag rise and with predominantly attached flow |
| 6.1.5 Additional Remarks | Nil |
| 6.2 Wall Interference Corrections | |
| 6.2.1 Solid and Wake Blockage. Give Procedures and Equations | Solid, but not wake, blockage corrections have been applied. See 6.2.2 below. Internal ARA Memo |
| 6.2.2 Give Blockage Factors as Functions of Mach Number | Mach number corrections are<br>$M < 0.86$ $\Delta M = 0$<br>$M = 0.88$ $\Delta M = -0.0004$ |
| 6.2.3 Upwash, Streamline Curvature and Lift Interference. Give Procedure and Equations | Working section flow angle and streamline curvature effects on $C_m$ were determined by testing the model both erect and inverted. See Table 8.5. |
| *6.2.4 Give Lift Interference Parameters* as Function of Mach Number. | Wall constraint is allowed for by correcting incidence.<br>$\Delta\alpha° = -0.2636\ C_L$ |
| 6.2.5 Reference on Wall-Interference Corrections | Internal ARA Memo |
| 6.2.6 Additional Remarks | Blockage buoyancy correction given in Table 8.6. |
| 6.3 Data Presentation | |
| 6.3.1 Aerodynamic Coefficients | $C_L$, $C_D$ and $C_m$ values are given in Table 8.4. |
| 6.3.2 Surface Pressure Coefficients | Table 8.7 and Figure 8.4 |
| 6.3.3 Flow Conditions for | |
| - *Aerodynamic coefficient data*<br>- Pressure data | *See Table 8.4* |
| 6.3.4 Boundary Layer and/or Wake Data | None |
| 6.3.5 Flow Conditions for Boundary Layer and/or Wake Data | N/A |

6.3.6 Wall Interference Corrections included? — Wall interference corrections have been applied to the data presented and the corrections themselves are detailed in 6.2.

6.3.7 Aeroelastic Corrections Included ? — No

6.3.8 Other Corrections — The overall drag measurements have been corrected for the force acting on the fuselage base, ie

$$\Delta C_D = C_p \text{ (Base) } \frac{\text{(Base Area)}}{\text{Ref Area}} \cos\alpha$$

6.3.9 Additional Remarks

6.4 Were Tests Carried out in Different Facilities on the Current Model? If so, What Facilities. Are Data Included in Present Data Base. — No

## 7 References


1) Haines A B, Jones J C M — The centre-line Mach-number distributions and auxiliary suction requirements for the ARA 9 ft x 8 ft transonic wind tunnel. ARC R&M 3140, 1960

2) Hills R — Design and operational problems of the electrically driven transonic wind tunnel. Journal of the Royal Aero Society, Vol 62, page 12, 1958


## 8 List of Symbols

| | |
|---|---|
| $c$ | Local chord |
| $\bar{c}$ | Standard mean chord |
| $\bar{\bar{c}}$ | Aerodynamic mean chord |
| $C_p$ | Pressure coefficient |
| $C_D$ | Drag coefficient $D/qS$ |
| $C_L$ | Lift coefficient $L/qS$ |
| $C_m$ | Pitching moment coefficient $m/qS\bar{\bar{c}}$ |
| $D$ | Drag |
| $L$ | Lift |
| $m$ | Pitching moment |
| $M$ | Mach number |
| $q$ | Dynamic pressure |
| $R_c$ | Reynolds number |
| $S$ | Wing area |
| $x$ | Chordwise distance from local leading edge in streamwise direction |
| $y$ | Spanwise distance from origin of wing axis system (see Figure 8.1) in dihedral plane |
| $z$ | Wing ordinate normal to dihedral plane |
| $\alpha$ | Angle of attack |
| $\eta$ | Ratio of spanwise distance from origin of wing axis system to net semispan, ETA |

Y=-99.4409 CHORD=442.9731

| UPPER SURFACE X/C | UPPER SURFACE Z/C | LOWER SURFACE X/C | LOWER SURFACE Z/C |
|---|---|---|---|
| 0.000000 | 0.007656 | 0.000000 | 0.007656 |
| 0.002408 | 0.020579 | 0.002408 | -0.003958 |
| 0.009607 | 0.034074 | 0.009607 | -0.014000 |
| 0.021530 | 0.047021 | 0.021530 | -0.022450 |
| 0.038060 | 0.058525 | 0.038060 | -0.029546 |
| 0.059039 | 0.068097 | 0.059039 | -0.035719 |
| 0.084265 | 0.075545 | 0.084265 | -0.041474 |
| 0.113495 | 0.080771 | 0.113495 | -0.047141 |
| 0.146447 | 0.083559 | 0.146447 | -0.052781 |
| 0.182803 | 0.083562 | 0.182803 | -0.058253 |
| 0.222215 | 0.080640 | 0.222215 | -0.063335 |
| 0.264302 | 0.074923 | 0.264302 | -0.067814 |
| 0.308658 | 0.067054 | 0.308658 | -0.071532 |
| 0.354858 | 0.057631 | 0.354858 | -0.074382 |
| 0.402455 | 0.048043 | 0.402455 | -0.076296 |
| 0.450991 | 0.038140 | 0.450991 | -0.077244 |
| 0.500000 | 0.028398 | 0.500000 | -0.077257 |
| 0.549009 | 0.016891 | 0.549009 | -0.076437 |
| 0.597545 | 0.008599 | 0.597545 | -0.074956 |
| 0.645142 | 0.000435 | 0.645142 | -0.073060 |
| 0.691342 | -0.008548 | 0.691342 | -0.071069 |
| 0.735698 | -0.017298 | 0.735698 | -0.069266 |
| 0.777785 | -0.025730 | 0.777765 | -0.067877 |
| 0.853553 | -0.041141 | 0.853553 | -0.066673 |
| 0.915735 | -0.053768 | 0.915735 | -0.067306 |
| 0.961940 | -0.063048 | 0.961940 | -0.069001 |
| 0.990393 | -0.068707 | 0.990393 | -0.071144 |
| 1.000000 | -0.070609 | 1.000000 | -0.072373 |

Y=0.0000 CHORD=371.0809

| UPPER SURFACE X/C | UPPER SURFACE Z/C | LOWER SURFACE X/C | LOWER SURFACE Z/C |
|---|---|---|---|
| 0.000000 | 0.002929 | 0.000000 | 0.002929 |
| 0.002408 | 0.014713 | 0.002408 | -0.007320 |
| 0.009607 | 0.026682 | 0.009607 | -0.017410 |
| 0.021530 | 0.037930 | 0.021530 | -0.025499 |
| 0.038060 | 0.047366 | 0.038060 | -0.032463 |
| 0.059039 | 0.056341 | 0.059039 | -0.038731 |
| 0.084265 | 0.062945 | 0.084265 | -0.044665 |
| 0.113495 | 0.067723 | 0.113495 | -0.050430 |
| 0.146447 | 0.070521 | 0.146447 | -0.055993 |
| 0.182803 | 0.071138 | 0.182803 | -0.061211 |
| 0.222215 | 0.069468 | 0.222215 | -0.065897 |
| 0.264302 | 0.065632 | 0.264302 | -0.069881 |
| 0.308658 | 0.059998 | 0.308658 | -0.073038 |
| 0.354858 | 0.053043 | 0.354858 | -0.075297 |
| 0.402455 | 0.045219 | 0.402455 | -0.076634 |
| 0.450991 | 0.036881 | 0.450991 | -0.077060 |
| 0.500000 | 0.028278 | 0.500000 | -0.076626 |
| 0.549009 | 0.019574 | 0.549009 | -0.075431 |
| 0.597545 | 0.010684 | 0.597545 | -0.073629 |
| 0.645142 | 0.002285 | 0.645142 | -0.071428 |
| 0.691342 | -0.006146 | 0.691342 | -0.069094 |
| 0.735698 | -0.014324 | 0.735698 | -0.066880 |
| 0.777785 | -0.022152 | 0.777765 | -0.064909 |
| 0.853553 | -0.036414 | 0.853553 | -0.062572 |
| 0.915735 | -0.048330 | 0.915735 | -0.062228 |
| 0.961940 | -0.057341 | 0.961940 | -0.063639 |
| 0.990393 | -0.062364 | 0.990393 | -0.065749 |
| 1.000000 | -0.064891 | 1.000000 | -0.066937 |

Y=43.4789 CHORD=339.8190

| UPPER SURFACE X/C | UPPER SURFACE Z/C | LOWER SURFACE X/C | LOWER SURFACE Z/C |
|---|---|---|---|
| 0.000000 | 0.001098 | 0.000000 | 0.001098 |
| 0.002408 | 0.012232 | 0.002408 | -0.009317 |
| 0.009607 | 0.023331 | 0.009607 | -0.018491 |
| 0.021530 | 0.033704 | 0.021530 | -0.026370 |
| 0.038060 | 0.042840 | 0.038060 | -0.033263 |
| 0.059039 | 0.050500 | 0.059039 | -0.039585 |
| 0.084265 | 0.056623 | 0.084265 | -0.045621 |
| 0.113495 | 0.061148 | 0.113495 | -0.051442 |
| 0.146447 | 0.063949 | 0.146447 | -0.056961 |
| 0.182803 | 0.064903 | 0.182803 | -0.062039 |
| 0.222215 | 0.063957 | 0.222215 | -0.066495 |
| 0.264302 | 0.061198 | 0.264302 | -0.070197 |
| 0.308658 | 0.056837 | 0.308658 | -0.073033 |
| 0.354859 | 0.051165 | 0.354858 | -0.074955 |
| 0.402455 | 0.044472 | 0.402455 | -0.075963 |
| 0.450991 | 0.037027 | 0.450991 | -0.076091 |
| 0.500000 | 0.029070 | 0.500000 | -0.075403 |
| 0.549009 | 0.020626 | 0.549009 | -0.073994 |
| 0.597545 | 0.012497 | 0.597545 | -0.072008 |
| 0.645142 | 0.004203 | 0.645142 | -0.069634 |
| 0.691342 | -0.003912 | 0.691342 | -0.067104 |
| 0.735698 | -0.011764 | 0.735698 | -0.064655 |
| 0.777785 | -0.019247 | 0.777785 | -0.062477 |
| 0.853553 | -0.032854 | 0.853553 | -0.059389 |
| 0.915735 | -0.044365 | 0.915735 | -0.058465 |
| 0.961939 | -0.053222 | 0.961939 | -0.059717 |
| 0.990392 | -0.058824 | 0.990392 | -0.061608 |
| 1.000000 | -0.060767 | 1.000000 | -0.063088 |

Y=86.9566 CHORD=308.1768

| UPPER SURFACE X/C | UPPER SURFACE Z/C | LOWER SURFACE X/C | LOWER SURFACE Z/C |
|---|---|---|---|
| 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 0.002408 | 0.010319 | 0.002408 | -0.009772 |
| 0.009607 | 0.020452 | 0.009607 | -0.018461 |
| 0.021530 | 0.029741 | 0.021530 | -0.026032 |
| 0.038060 | 0.037789 | 0.038060 | -0.032810 |
| 0.059039 | 0.044506 | 0.059039 | -0.039157 |
| 0.084265 | 0.049943 | 0.084265 | -0.045265 |
| 0.113495 | 0.054084 | 0.113495 | -0.051118 |
| 0.146447 | 0.056849 | 0.146447 | -0.056597 |
| 0.182803 | 0.058179 | 0.182803 | -0.061557 |
| 0.222215 | 0.058053 | 0.222215 | -0.065855 |
| 0.264302 | 0.056192 | 0.264302 | -0.069347 |
| 0.308658 | 0.053353 | 0.308658 | -0.071927 |
| 0.354858 | 0.049335 | 0.354858 | -0.073548 |
| 0.402455 | 0.043979 | 0.402455 | -0.074236 |
| 0.450991 | 0.037684 | 0.450991 | -0.074058 |
| 0.500000 | 0.030607 | 0.500000 | -0.073096 |
| 0.549009 | 0.023060 | 0.549009 | -0.071462 |
| 0.597545 | 0.015292 | 0.597545 | -0.069263 |
| 0.645142 | 0.007529 | 0.645142 | -0.066729 |
| 0.691342 | -0.000082 | 0.691342 | -0.063534 |
| 0.735698 | -0.007443 | 0.735698 | -0.061257 |
| 0.777785 | -0.014471 | 0.777785 | -0.058728 |
| 0.853553 | -0.027324 | 0.853553 | -0.054778 |
| 0.915735 | -0.038416 | 0.915735 | -0.053148 |
| 0.961940 | -0.047180 | 0.961940 | -0.053946 |
| 0.990393 | -0.052770 | 0.990393 | -0.055970 |
| 1.000000 | -0.054705 | 1.000000 | -0.057240 |

Y=130.4345 CHORD=276.7350

| UPPER SURFACE X/C | UPPER SURFACE Z/C | LOWER SURFACE X/C | LOWER SURFACE Z/C |
|---|---|---|---|
| 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 0.002408 | 0.008985 | 0.002408 | -0.008323 |
| 0.009607 | 0.018058 | 0.009607 | -0.015640 |
| 0.021530 | 0.026517 | 0.021530 | -0.022788 |
| 0.038060 | 0.033902 | 0.038060 | -0.029370 |
| 0.059039 | 0.040041 | 0.059039 | -0.035759 |
| 0.084265 | 0.044964 | 0.084265 | -0.041911 |
| 0.113495 | 0.048735 | 0.113495 | -0.047752 |
| 0.146447 | 0.051395 | 0.146447 | -0.053206 |
| 0.182803 | 0.052969 | 0.182803 | -0.058191 |
| 0.222215 | 0.053430 | 0.222215 | -0.062577 |
| 0.264302 | 0.052705 | 0.264302 | -0.066177 |
| 0.308658 | 0.050729 | 0.308658 | -0.068804 |
| 0.354858 | 0.047517 | 0.354858 | -0.070355 |
| 0.402455 | 0.043190 | 0.402455 | -0.070856 |
| 0.450991 | 0.037947 | 0.450991 | -0.070434 |
| 0.500000 | 0.032007 | 0.500000 | -0.069251 |
| 0.549009 | 0.025592 | 0.549009 | -0.067459 |
| 0.597545 | 0.018929 | 0.597545 | -0.065180 |
| 0.645142 | 0.012236 | 0.645142 | -0.062627 |
| 0.691342 | 0.005668 | 0.691342 | -0.059654 |
| 0.735698 | -0.000708 | 0.735698 | -0.056605 |
| 0.777785 | -0.008900 | 0.777785 | -0.053599 |
| 0.853553 | -0.018707 | 0.853553 | -0.048038 |
| 0.915734 | -0.029285 | 0.915734 | -0.044767 |
| 0.961940 | -0.037775 | 0.961940 | -0.044768 |
| 0.990392 | -0.043310 | 0.990392 | -0.046791 |
| 1.000000 | -0.045275 | 1.000000 | -0.048098 |

Y=173.9129 CHORD=245.2927

| UPPER SURFACE X/C | UPPER SURFACE Z/C | LOWER SURFACE X/C | LOWER SURFACE Z/C |
|---|---|---|---|
| 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 0.002408 | 0.007867 | 0.002408 | -0.007225 |
| 0.009607 | 0.016009 | 0.009607 | -0.013841 |
| 0.021530 | 0.023891 | 0.021530 | -0.020062 |
| 0.038060 | 0.031057 | 0.038060 | -0.026074 |
| 0.059039 | 0.037197 | 0.059039 | -0.031950 |
| 0.084265 | 0.042191 | 0.084265 | -0.037657 |
| 0.113495 | 0.046063 | 0.113495 | -0.043121 |
| 0.146447 | 0.048864 | 0.146447 | -0.048287 |
| 0.182803 | 0.050607 | 0.182803 | -0.053057 |
| 0.222215 | 0.051264 | 0.222215 | -0.057412 |
| 0.264302 | 0.050805 | 0.264302 | -0.061011 |
| 0.308658 | 0.049237 | 0.308658 | -0.063658 |
| 0.354858 | 0.046542 | 0.354858 | -0.065192 |
| 0.402455 | 0.043163 | 0.402455 | -0.065600 |
| 0.450991 | 0.038378 | 0.450991 | -0.064993 |
| 0.500000 | 0.034252 | 0.500000 | -0.063544 |
| 0.549009 | 0.029141 | 0.549009 | -0.061439 |
| 0.597545 | 0.023791 | 0.597545 | -0.058812 |
| 0.645142 | 0.018356 | 0.645142 | -0.055808 |
| 0.691342 | 0.012958 | 0.691342 | -0.052549 |
| 0.735698 | 0.007636 | 0.735698 | -0.049139 |
| 0.777785 | 0.002346 | 0.777785 | -0.045643 |
| 0.853553 | -0.008255 | 0.853553 | -0.038870 |
| 0.915735 | -0.018209 | 0.915735 | -0.034325 |
| 0.961940 | -0.026305 | 0.961940 | -0.033675 |
| 0.990393 | -0.031569 | 0.990393 | -0.035411 |
| 1.000000 | -0.033438 | 1.000000 | -0.036658 |

TABLE 8.1 M100 WING GEOMETRY

Y=217.3912 CHORD=213.8509

UPPER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | 0.007274 |
| 0.009607 | 0.014955 |
| 0.021530 | 0.022551 |
| 0.038060 | 0.029650 |
| 0.059039 | 0.035948 |
| 0.084265 | 0.041215 |
| 0.113495 | 0.045335 |
| 0.146447 | 0.048276 |
| 0.182803 | 0.050049 |
| 0.222215 | 0.050702 |
| 0.264302 | 0.050327 |
| 0.306658 | 0.049064 |
| 0.354858 | 0.047067 |
| 0.402455 | 0.044471 |
| 0.450991 | 0.041371 |
| 0.500000 | 0.037644 |
| 0.549009 | 0.033963 |
| 0.597545 | 0.029327 |
| 0.645142 | 0.025537 |
| 0.691342 | 0.021157 |
| 0.735698 | 0.016697 |
| 0.777785 | 0.012125 |
| 0.853553 | 0.002552 |
| 0.915735 | -0.007009 |
| 0.961940 | -0.015056 |
| 0.990393 | -0.020320 |
| 1.000000 | -0.022129 |

LOWER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | -0.006581 |
| 0.009607 | -0.012568 |
| 0.021530 | -0.018179 |
| 0.038060 | -0.023506 |
| 0.059039 | -0.028717 |
| 0.084265 | -0.033837 |
| 0.113495 | -0.038809 |
| 0.146447 | -0.043577 |
| 0.182803 | -0.048083 |
| 0.222215 | -0.052187 |
| 0.264302 | -0.055689 |
| 0.306658 | -0.058280 |
| 0.354858 | -0.059824 |
| 0.402455 | -0.060208 |
| 0.450991 | -0.059464 |
| 0.500000 | -0.057726 |
| 0.549009 | -0.055165 |
| 0.597545 | -0.052040 |
| 0.645142 | -0.048501 |
| 0.691342 | -0.044758 |
| 0.735698 | -0.040945 |
| 0.777785 | -0.037146 |
| 0.853553 | -0.029916 |
| 0.915735 | -0.024000 |
| 0.961940 | -0.023385 |
| 0.990393 | -0.024603 |
| 1.000000 | -0.025772 |

Y=251.7911 CHORD=188.9739

UPPER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | 0.007138 |
| 0.009607 | 0.014628 |
| 0.021530 | 0.022510 |
| 0.038060 | 0.029743 |
| 0.059039 | 0.036226 |
| 0.084265 | 0.041702 |
| 0.113495 | 0.045978 |
| 0.146447 | 0.049002 |
| 0.182803 | 0.050848 |
| 0.222215 | 0.051642 |
| 0.264302 | 0.051539 |
| 0.306658 | 0.050707 |
| 0.354858 | 0.049239 |
| 0.402455 | 0.047392 |
| 0.450991 | 0.045069 |
| 0.500000 | 0.042350 |
| 0.549009 | 0.039277 |
| 0.597545 | 0.035915 |
| 0.645142 | 0.032315 |
| 0.691342 | 0.028478 |
| 0.735698 | 0.024386 |
| 0.777785 | 0.020040 |
| 0.853553 | 0.010644 |
| 0.915735 | 0.000838 |
| 0.961940 | -0.007692 |
| 0.990393 | -0.013432 |
| 1.000000 | -0.015401 |

LOWER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | -0.006284 |
| 0.009607 | -0.011942 |
| 0.021530 | -0.017195 |
| 0.038060 | -0.022214 |
| 0.059039 | -0.027151 |
| 0.084265 | -0.032019 |
| 0.113495 | -0.036762 |
| 0.146447 | -0.041328 |
| 0.182803 | -0.045663 |
| 0.222215 | -0.049540 |
| 0.264302 | -0.053052 |
| 0.306658 | -0.055649 |
| 0.354858 | -0.057158 |
| 0.402455 | -0.057543 |
| 0.450991 | -0.056647 |
| 0.500000 | -0.054611 |
| 0.549009 | -0.051632 |
| 0.597545 | -0.047977 |
| 0.645142 | -0.043924 |
| 0.691342 | -0.039712 |
| 0.735698 | -0.035542 |
| 0.777785 | -0.031529 |
| 0.853553 | -0.024171 |
| 0.915735 | -0.018303 |
| 0.961940 | -0.017098 |
| 0.990393 | -0.018209 |
| 1.000000 | -0.019541 |

Y=304.3478 CHORD=179.0178

UPPER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | 0.006585 |
| 0.009607 | 0.013722 |
| 0.021530 | 0.020663 |
| 0.038060 | 0.027495 |
| 0.059039 | 0.033295 |
| 0.084265 | 0.038134 |
| 0.113495 | 0.042015 |
| 0.146447 | 0.045020 |
| 0.182803 | 0.047258 |
| 0.222215 | 0.048814 |
| 0.264302 | 0.049745 |
| 0.306658 | 0.050100 |
| 0.354858 | 0.049930 |
| 0.402456 | 0.049288 |
| 0.450991 | 0.048219 |
| 0.500000 | 0.046761 |
| 0.549009 | 0.044934 |
| 0.597546 | 0.042724 |
| 0.645143 | 0.040057 |
| 0.691343 | 0.036821 |
| 0.735699 | 0.032975 |
| 0.777786 | 0.028608 |
| 0.853554 | 0.018930 |
| 0.915736 | 0.008779 |
| 0.961941 | -0.000308 |
| 0.990394 | -0.006543 |
| 1.000000 | -0.008773 |

LOWER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | -0.005779 |
| 0.009607 | -0.010884 |
| 0.021530 | -0.015514 |
| 0.038060 | -0.019849 |
| 0.059039 | -0.024045 |
| 0.084265 | -0.028166 |
| 0.113495 | -0.032209 |
| 0.146447 | -0.036133 |
| 0.182803 | -0.039871 |
| 0.222215 | -0.043299 |
| 0.264302 | -0.046234 |
| 0.306658 | -0.048446 |
| 0.354858 | -0.049684 |
| 0.402456 | -0.049746 |
| 0.450991 | -0.048529 |
| 0.500000 | -0.046084 |
| 0.549009 | -0.042608 |
| 0.597546 | -0.038401 |
| 0.645143 | -0.033868 |
| 0.691343 | -0.029273 |
| 0.735699 | -0.024881 |
| 0.777786 | -0.020052 |
| 0.853554 | -0.014152 |
| 0.915736 | -0.010063 |
| 0.961941 | -0.009842 |
| 0.990394 | -0.012191 |
| 1.000000 | -0.013737 |

Y=358.6958 CHORD=168.7221

UPPER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | 0.006963 |
| 0.009607 | 0.014313 |
| 0.021530 | 0.021527 |
| 0.038060 | 0.028083 |
| 0.059039 | 0.033686 |
| 0.084265 | 0.038325 |
| 0.113495 | 0.042172 |
| 0.146447 | 0.045422 |
| 0.182803 | 0.048189 |
| 0.222215 | 0.050500 |
| 0.264302 | 0.052326 |
| 0.306658 | 0.053622 |
| 0.354858 | 0.054363 |
| 0.402455 | 0.054558 |
| 0.450992 | 0.054235 |
| 0.500001 | 0.053421 |
| 0.549010 | 0.052111 |
| 0.597546 | 0.050245 |
| 0.645143 | 0.047716 |
| 0.691343 | 0.044435 |
| 0.735699 | 0.040404 |
| 0.777786 | 0.035760 |
| 0.853554 | 0.025396 |
| 0.915736 | 0.014543 |
| 0.961941 | 0.004742 |
| 0.990394 | -0.002000 |
| 1.000000 | -0.004478 |

LOWER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | -0.006248 |
| 0.009607 | -0.011697 |
| 0.021530 | -0.016445 |
| 0.038060 | -0.020686 |
| 0.059039 | -0.024623 |
| 0.084265 | -0.028425 |
| 0.113495 | -0.032163 |
| 0.146447 | -0.035812 |
| 0.182803 | -0.039272 |
| 0.222215 | -0.042384 |
| 0.264302 | -0.044946 |
| 0.306658 | -0.046719 |
| 0.354858 | -0.047459 |
| 0.402455 | -0.046952 |
| 0.450992 | -0.045086 |
| 0.500001 | -0.041891 |
| 0.549010 | -0.037582 |
| 0.597546 | -0.032428 |
| 0.645143 | -0.026947 |
| 0.691343 | -0.021491 |
| 0.735699 | -0.016427 |
| 0.777786 | -0.012022 |
| 0.853554 | -0.005640 |
| 0.915736 | -0.003788 |
| 0.961941 | -0.005636 |
| 0.990394 | -0.009204 |
| 1.000000 | -0.011033 |

Y=413.0434 CHORD=158.4287

UPPER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | 0.007775 |
| 0.009607 | 0.015769 |
| 0.021530 | 0.023431 |
| 0.038060 | 0.030342 |
| 0.059039 | 0.036305 |
| 0.084265 | 0.041323 |
| 0.113495 | 0.045520 |
| 0.146447 | 0.049067 |
| 0.182803 | 0.052096 |
| 0.222215 | 0.054671 |
| 0.264302 | 0.056789 |
| 0.306658 | 0.058420 |
| 0.354858 | 0.059527 |
| 0.402455 | 0.060087 |
| 0.450992 | 0.060069 |
| 0.500000 | 0.059432 |
| 0.549009 | 0.058133 |
| 0.597545 | 0.056117 |
| 0.645143 | 0.053360 |
| 0.691343 | 0.049906 |
| 0.735699 | 0.045251 |
| 0.777786 | 0.041305 |
| 0.853554 | 0.031076 |
| 0.915736 | 0.020064 |
| 0.961941 | 0.010073 |
| 0.990394 | 0.003169 |
| 1.000000 | 0.000638 |

LOWER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | -0.007068 |
| 0.009607 | -0.013178 |
| 0.021530 | -0.018354 |
| 0.038060 | -0.022796 |
| 0.059039 | -0.026778 |
| 0.084265 | -0.030533 |
| 0.113495 | -0.034198 |
| 0.146447 | -0.037768 |
| 0.182803 | -0.041121 |
| 0.222215 | -0.044051 |
| 0.264302 | -0.046318 |
| 0.306658 | -0.047661 |
| 0.354858 | -0.047851 |
| 0.402455 | -0.046694 |
| 0.450992 | -0.044097 |
| 0.500000 | -0.040093 |
| 0.549009 | -0.034871 |
| 0.597545 | -0.028765 |
| 0.645143 | -0.022225 |
| 0.691343 | -0.015751 |
| 0.735699 | -0.009845 |
| 0.777786 | -0.004938 |
| 0.853554 | 0.000655 |
| 0.915736 | 0.001262 |
| 0.961941 | -0.001832 |
| 0.990394 | -0.005645 |
| 1.000000 | -0.007517 |

Y=478.2607 CHORD=146.0722

UPPER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | 0.007954 |
| 0.009607 | 0.016127 |
| 0.021530 | 0.023854 |
| 0.038060 | 0.031029 |
| 0.059039 | 0.037178 |
| 0.084265 | 0.042339 |
| 0.113495 | 0.046739 |
| 0.146447 | 0.050527 |
| 0.182803 | 0.053730 |
| 0.222215 | 0.056477 |
| 0.264302 | 0.058779 |
| 0.306658 | 0.060612 |
| 0.354858 | 0.061941 |
| 0.402455 | 0.062736 |
| 0.450991 | 0.062952 |
| 0.500000 | 0.062533 |
| 0.549009 | 0.061421 |
| 0.597545 | 0.059363 |
| 0.645142 | 0.056952 |
| 0.691342 | 0.053659 |
| 0.735698 | 0.049796 |
| 0.777785 | 0.045463 |
| 0.853553 | 0.035588 |
| 0.915735 | 0.024764 |
| 0.961940 | 0.014864 |
| 0.990393 | 0.007977 |
| 1.000000 | 0.005446 |

LOWER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | -0.007276 |
| 0.009607 | -0.013535 |
| 0.021530 | -0.018764 |
| 0.038060 | -0.023218 |
| 0.059039 | -0.027120 |
| 0.084265 | -0.030746 |
| 0.113495 | -0.034254 |
| 0.146447 | -0.037657 |
| 0.182803 | -0.040829 |
| 0.222215 | -0.043554 |
| 0.264302 | -0.045578 |
| 0.306658 | -0.046645 |
| 0.354858 | -0.046564 |
| 0.402455 | -0.045059 |
| 0.450991 | -0.042059 |
| 0.500000 | -0.037747 |
| 0.549009 | -0.032187 |
| 0.597545 | -0.025717 |
| 0.645142 | -0.018779 |
| 0.691342 | -0.011894 |
| 0.735698 | -0.005838 |
| 0.777785 | -0.000494 |
| 0.853553 | 0.005389 |
| 0.915735 | 0.005627 |
| 0.961940 | 0.002520 |
| 0.990393 | -0.001175 |
| 1.000000 | -0.003043 |

TABLE 8.1 (contd) M100 WING GEOMETRY

**Y=532.8085 CHORD=135.7787**

| UPPER SURFACE X/C | UPPER SURFACE Z/C | LOWER SURFACE X/C | LOWER SURFACE Z/C |
|---|---|---|---|
| 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 0.002408 | 0.007859 | 0.002408 | -0.007031 |
| 0.009607 | 0.015939 | 0.009607 | -0.013080 |
| 0.021530 | 0.023698 | 0.021530 | -0.018170 |
| 0.038060 | 0.030738 | 0.038060 | -0.022503 |
| 0.059039 | 0.036872 | 0.059039 | -0.026368 |
| 0.084265 | 0.042098 | 0.084265 | -0.029987 |
| 0.113495 | 0.046595 | 0.113495 | -0.033511 |
| 0.146447 | 0.050347 | 0.146447 | -0.036891 |
| 0.182803 | 0.053665 | 0.182803 | -0.040013 |
| 0.222215 | 0.056549 | 0.222215 | -0.042681 |
| 0.264302 | 0.058998 | 0.264302 | -0.044658 |
| 0.308658 | 0.060975 | 0.308659 | -0.045689 |
| 0.354858 | 0.062441 | 0.354858 | -0.045542 |
| 0.402455 | 0.063362 | 0.402455 | -0.044027 |
| 0.450991 | 0.063701 | 0.450991 | -0.041043 |
| 0.500000 | 0.063407 | 0.500000 | -0.036614 |
| 0.549009 | 0.062431 | 0.549009 | -0.030935 |
| 0.597545 | 0.060722 | 0.597545 | -0.024391 |
| 0.645142 | 0.058261 | 0.645142 | -0.017435 |
| 0.691342 | 0.055101 | 0.691342 | -0.010601 |
| 0.735698 | 0.051345 | 0.735698 | -0.004327 |
| 0.777785 | 0.047105 | 0.777785 | 0.000967 |
| 0.853553 | 0.037461 | 0.853553 | 0.007541 |
| 0.915735 | 0.026982 | 0.915735 | 0.008436 |
| 0.961940 | 0.017446 | 0.961940 | 0.005609 |
| 0.990393 | 0.010868 | 0.990393 | 0.001991 |
| 1.000000 | 0.008464 | 1.000000 | 0.000246 |

**Y=588.9567 CHORD=125.5085**

| UPPER SURFACE X/C | UPPER SURFACE Z/C | LOWER SURFACE X/C | LOWER SURFACE Z/C |
|---|---|---|---|
| 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 0.002408 | 0.007878 | 0.002408 | -0.006800 |
| 0.009607 | 0.015931 | 0.009607 | -0.012678 |
| 0.021530 | 0.023641 | 0.021530 | -0.017691 |
| 0.038060 | 0.030645 | 0.038060 | -0.022042 |
| 0.059039 | 0.036774 | 0.059039 | -0.026049 |
| 0.084265 | 0.042033 | 0.084265 | -0.029920 |
| 0.113495 | 0.046540 | 0.113495 | -0.033678 |
| 0.146447 | 0.050451 | 0.146447 | -0.037241 |
| 0.182803 | 0.053883 | 0.182803 | -0.040475 |
| 0.222215 | 0.056889 | 0.222215 | -0.043212 |
| 0.264302 | 0.059481 | 0.264302 | -0.045241 |
| 0.308658 | 0.061550 | 0.308658 | -0.046302 |
| 0.354858 | 0.063110 | 0.354858 | -0.046181 |
| 0.402455 | 0.064098 | 0.402455 | -0.044611 |
| 0.450991 | 0.064469 | 0.450991 | -0.041517 |
| 0.500000 | 0.064172 | 0.500000 | -0.036862 |
| 0.549009 | 0.063167 | 0.549009 | -0.030854 |
| 0.597545 | 0.061412 | 0.597545 | -0.024060 |
| 0.645142 | 0.058911 | 0.645142 | -0.016928 |
| 0.691342 | 0.055742 | 0.691342 | -0.010064 |
| 0.735698 | 0.052022 | 0.735698 | -0.003696 |
| 0.777785 | 0.047877 | 0.777785 | 0.001828 |
| 0.853553 | 0.038563 | 0.853553 | 0.009235 |
| 0.915735 | 0.028602 | 0.915735 | 0.010688 |
| 0.961939 | 0.019657 | 0.961939 | 0.008137 |
| 0.990393 | 0.013564 | 0.990393 | 0.004641 |
| 1.000000 | 0.011364 | 1.000000 | 0.003100 |

**Y=641.3045 CHORD=115.1858**

| UPPER SURFACE X/C | UPPER SURFACE Z/C | LOWER SURFACE X/C | LOWER SURFACE Z/C |
|---|---|---|---|
| 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 0.002408 | 0.007434 | 0.002408 | -0.006574 |
| 0.009607 | 0.015230 | 0.009607 | -0.012302 |
| 0.021530 | 0.022804 | 0.021530 | -0.017278 |
| 0.038060 | 0.029668 | 0.038060 | -0.021720 |
| 0.059039 | 0.035687 | 0.059039 | -0.025906 |
| 0.084265 | 0.040859 | 0.084265 | -0.029978 |
| 0.113495 | 0.045377 | 0.113495 | -0.033906 |
| 0.146447 | 0.049351 | 0.146447 | -0.037569 |
| 0.182803 | 0.052891 | 0.182803 | -0.040829 |
| 0.222215 | 0.056012 | 0.222215 | -0.043536 |
| 0.264302 | 0.058675 | 0.264302 | -0.045508 |
| 0.308658 | 0.060893 | 0.308658 | -0.046305 |
| 0.354858 | 0.062438 | 0.354858 | -0.046276 |
| 0.402455 | 0.063457 | 0.402455 | -0.044602 |
| 0.450991 | 0.063874 | 0.450991 | -0.041365 |
| 0.500000 | 0.063674 | 0.500000 | -0.036558 |
| 0.549009 | 0.062828 | 0.549009 | -0.030457 |
| 0.597544 | 0.061295 | 0.597544 | -0.023534 |
| 0.645142 | 0.059072 | 0.645142 | -0.016326 |
| 0.691341 | 0.056214 | 0.691341 | -0.009343 |
| 0.735697 | 0.052821 | 0.735697 | -0.002968 |
| 0.777784 | 0.049007 | 0.777784 | 0.002439 |
| 0.853552 | 0.040398 | 0.853552 | 0.009522 |
| 0.915734 | 0.031147 | 0.915734 | 0.011780 |
| 0.961939 | 0.022728 | 0.961939 | 0.010728 |
| 0.990392 | 0.016807 | 0.990392 | 0.007854 |
| 1.000000 | 0.014589 | 1.000000 | 0.006299 |

**Y=695.6523 CHORD=104.8904**

| UPPER SURFACE X/C | UPPER SURFACE Z/C | LOWER SURFACE X/C | LOWER SURFACE Z/C |
|---|---|---|---|
| 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 0.002408 | 0.007405 | 0.002408 | -0.006698 |
| 0.009607 | 0.015134 | 0.009607 | -0.012467 |
| 0.021530 | 0.022536 | 0.021530 | -0.017437 |
| 0.038060 | 0.029166 | 0.038060 | -0.021898 |
| 0.059039 | 0.034956 | 0.059039 | -0.026108 |
| 0.084265 | 0.040044 | 0.084265 | -0.030179 |
| 0.113495 | 0.044580 | 0.113495 | -0.034061 |
| 0.146447 | 0.048657 | 0.146447 | -0.037687 |
| 0.182803 | 0.052330 | 0.182803 | -0.040858 |
| 0.222215 | 0.055590 | 0.222215 | -0.043455 |
| 0.264302 | 0.058401 | 0.264302 | -0.045308 |
| 0.306658 | 0.060728 | 0.306658 | -0.046204 |
| 0.354857 | 0.062532 | 0.354857 | -0.045896 |
| 0.402455 | 0.063787 | 0.402455 | -0.044171 |
| 0.450991 | 0.064473 | 0.450991 | -0.040901 |
| 0.499999 | 0.064559 | 0.499999 | -0.036118 |
| 0.549008 | 0.063992 | 0.549008 | -0.030049 |
| 0.597544 | 0.062712 | 0.597544 | -0.023062 |
| 0.645141 | 0.060693 | 0.645141 | -0.015811 |
| 0.691341 | 0.057958 | 0.691341 | -0.008711 |
| 0.735697 | 0.054595 | 0.735697 | -0.002281 |
| 0.777784 | 0.050739 | 0.777784 | 0.003139 |
| 0.853552 | 0.042084 | 0.853552 | 0.010423 |
| 0.915734 | 0.033191 | 0.915734 | 0.013426 |
| 0.961939 | 0.025490 | 0.961939 | 0.013331 |
| 0.990392 | 0.020192 | 0.990392 | 0.011277 |
| 1.000000 | 0.018218 | 1.000000 | 0.009943 |

**Y=760.8696 CHORD=92.5355**

| UPPER SURFACE X/C | UPPER SURFACE Z/C | LOWER SURFACE X/C | LOWER SURFACE Z/C |
|---|---|---|---|
| 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 0.002408 | 0.007624 | 0.002408 | -0.005991 |
| 0.009607 | 0.015739 | 0.009607 | -0.012081 |
| 0.021530 | 0.023062 | 0.021530 | -0.017833 |
| 0.038060 | 0.029582 | 0.038060 | -0.022193 |
| 0.059039 | 0.035295 | 0.059039 | -0.026262 |
| 0.084265 | 0.040407 | 0.084265 | -0.030171 |
| 0.113495 | 0.045078 | 0.113495 | -0.033292 |
| 0.146448 | 0.049360 | 0.146448 | -0.037311 |
| 0.182804 | 0.053248 | 0.182804 | -0.040291 |
| 0.222215 | 0.056734 | 0.222215 | -0.042690 |
| 0.264303 | 0.059813 | 0.264303 | -0.044345 |
| 0.306658 | 0.062463 | 0.306658 | -0.045054 |
| 0.354859 | 0.064648 | 0.354859 | -0.044595 |
| 0.402456 | 0.066335 | 0.402456 | -0.042763 |
| 0.450992 | 0.067470 | 0.450992 | -0.039418 |
| 0.500001 | 0.067965 | 0.500001 | -0.034550 |
| 0.549010 | 0.067721 | 0.549010 | -0.028336 |
| 0.597546 | 0.066662 | 0.597546 | -0.021172 |
| 0.645143 | 0.064746 | 0.645143 | -0.013870 |
| 0.691343 | 0.061987 | 0.691343 | -0.006373 |
| 0.735699 | 0.058488 | 0.735699 | 0.000294 |
| 0.777786 | 0.054420 | 0.777786 | 0.006066 |
| 0.853554 | 0.045379 | 0.853554 | 0.014449 |
| 0.915736 | 0.036638 | 0.915736 | 0.017994 |
| 0.961941 | 0.029711 | 0.961941 | 0.017902 |
| 0.990394 | 0.025312 | 0.990394 | 0.016424 |
| 1.000000 | 0.023777 | 1.000000 | 0.015495 |

**Y=809.9335 CHORD=83.2418**

| UPPER SURFACE X/C | UPPER SURFACE Z/C | LOWER SURFACE X/C | LOWER SURFACE Z/C |
|---|---|---|---|
| 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 0.002408 | 0.007742 | 0.002408 | -0.006908 |
| 0.009607 | 0.015681 | 0.009607 | -0.012721 |
| 0.021530 | 0.023097 | 0.021530 | -0.017595 |
| 0.038060 | 0.029737 | 0.038060 | -0.021865 |
| 0.059039 | 0.035608 | 0.059039 | -0.025822 |
| 0.084265 | 0.040887 | 0.084265 | -0.029595 |
| 0.113496 | 0.045727 | 0.113495 | -0.033156 |
| 0.146447 | 0.050191 | 0.146447 | -0.036390 |
| 0.182802 | 0.054283 | 0.182802 | -0.039162 |
| 0.222214 | 0.057991 | 0.222214 | -0.041334 |
| 0.264302 | 0.061301 | 0.264302 | -0.042742 |
| 0.306657 | 0.064164 | 0.306657 | -0.043186 |
| 0.354857 | 0.066603 | 0.354857 | -0.042442 |
| 0.402454 | 0.068522 | 0.402454 | -0.040305 |
| 0.450990 | 0.069392 | 0.450990 | -0.036643 |
| 0.499999 | 0.070635 | 0.499999 | -0.031457 |
| 0.549008 | 0.070660 | 0.549008 | -0.024939 |
| 0.597544 | 0.069890 | 0.597544 | -0.017486 |
| 0.645141 | 0.068282 | 0.645141 | -0.009708 |
| 0.691341 | 0.065651 | 0.691341 | -0.002135 |
| 0.735697 | 0.062691 | 0.735697 | 0.004783 |
| 0.777784 | 0.058962 | 0.777784 | 0.010764 |
| 0.853552 | 0.050534 | 0.853552 | 0.019416 |
| 0.915734 | 0.042193 | 0.915734 | 0.023279 |
| 0.961938 | 0.035419 | 0.961938 | 0.023524 |
| 0.990392 | 0.031018 | 0.990392 | 0.022124 |
| 1.000000 | 0.029451 | 1.000000 | 0.021172 |

TABLE 8.1 (contd) M100 WING GEOMETRY

| Distance aft of model nose metres | Fuselage radius metres | Total cross sectional area metres² |
|---|---|---|
| 0 | 0 | 0 |
| 0.0508 | 0.0186 | 0.001083 |
| 0.1016 | 0.0351 | 0.003877 |
| 0.1524 | 0.0497 | 0.007755 |
| 0.2032 | 0.0623 | 0.012186 |
| 0.2540 | 0.0730 | 0.016741 |
| 0.3048 | 0.0818 | 0.021041 |
| 0.3556 | 0.0888 | 0.024801 |
| 0.4064 | 0.0941 | 0.027807 |
| 0.4572 | 0.0975 | 0.029855 |
| 0.5080 | 0.0992 | 0.030923 |
| 0.5311 | 0.0994 | 0.031064 |
| ↓ | ↓ | ↓ |
| 0.6195 | 0.0994 | 0.031064 |
| 0.6703 | 0.0994 | 0.035102 |
| 0.7211 | 0.0994 | 0.039805 |
| 0.7719 | 0.0994 | 0.043368 |
| 0.8227 | 0.0994 | 0.045446 |
| 0.8735 | 0.0994 | 0.045378 |
| 0.9243 | 0.0994 | 0.043610 |
| 0.9751 | 0.0994 | 0.040245 |
| 1.0259 | 0.0994 | 0.036888 |
| 1.0767 | 0.0994 | 0.035693 |
| 1.1275 | 0.0994 | 0.034877 |
| 1.1783 | 0.0994 | 0.033769 |
| 1.2291 | 0.0993 | 0.031632 |
| 1.2799 | 0.0975 | 0.029941 |
| 1.3307 | 0.0955 | 0.028655 |
| 1.3815 | 0.0909 | 0.025977 |
| 1.4323 | 0.0859 | 0.023155 |
| 1.4831 | 0.0782 | 0.019227 |
| 1.5339 | 0.0681 | 0.014557 |
| 1.5847 | 0.0549 | 0.009456 |
| 1.6286 | 0.0445 | 0.006207 |

TABLE 8.2 CROSS SECTIONAL AREA DISTRIBUTIONS

## Wing Upper Surface

25 pressure tappings were installed on the upper surface at each of the 8 spanwise pressure measuring stations. These tappings were located at:

| | | | | | | |
|---|---|---|---|---|---|---|
| x/c = 0.000 | 0.015* | 0.025* | 0.050 | 0.075 | 0.100 | 0.150 |
| 0.200 | 0.250 | 0.300 | 0.350 | 0.400 | 0.450 | 0.500 |
| 0.550 | 0.600 | 0.650 | 0.700 | 0.750 | 0.800 | 0.850 |
| 0.900 | 0.950 | 0.990 | 1.000 | | | |

*0.015 and 0.025 are nominal locations, the actual x/c positions of these ports varied across the span as detailed below.

| Nominal x/c | ETA = 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.015 | 0.013 | 0.013 | 0.014 | 0.014 | 0.015 | 0.016 | 0.017 | 0.017 |
| 0.025 | 0.022 | 0.022 | 0.021 | 0.021 | 0.020 | 0.020 | 0.018 | 0.018 |

## Wing Lower Surface

20 pressure tappings were installed on the lower surface at each of the 8 spanwise pressure measuring stations. These tappings were located at:

| | | | | | | |
|---|---|---|---|---|---|---|
| x/c = 0.010# | 0.025# | 0.050 | 0.075 | 0.100 | 0.160 | 0.220 |
| 0.280 | 0.340 | 0.400 | 0.460 | 0.520 | 0.580 | 0.640 |
| 0.700 | 0.760 | 0.820 | 0.880 | 0.940 | 0.990 | |

#0.010 and 0.025 are nominal locations, the actual x/c positions of these ports varied across the span as detailed below.

| Nominal x/c | ETA = 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.010 | 0.013 | 0.013 | 0.014 | 0.014 | 0.015 | 0.016 | 0.017 | 0.017 |
| 0.025 | 0.022 | 0.022 | 0.021 | 0.021 | 0.020 | 0.020 | 0.018 | 0.018 |

## Unserviceable Pressure Ports

The following pressure ports were unserviceable for these tests:

| | | |
|---|---|---|
| Upper Surface | ETA = 0.325 | x/c = 1.000 |
| Lower Surface | ETA = 0.325 | x/c = 0.220 |
| | ETA = 0.455 | x/c = 0.015 0.640 |
| | ETA = 0.633 | x/c = 0.280 |
| | ETA = 0.935 | x/c = 0.050 |

| | |
|---|---|
| Total number of upper surface ports | 200 |
| Total number of lower surface ports | 160 |
| | 360 |
| Total number of unserviceable ports | 6 |
| | 354 |

TABLE 8.3 LOCATION OF M100 WING STATIC PRESSURE PORTS

| MACH NUMBER | α° | $C_L$ | $C_D$ | $C_m$ | TRANSITION* BAND |
|---|---|---|---|---|---|
| 0.8001 | -3.017 | -0.0232 | 0.01647 | -0.0592 | 1 |
| 0.8004 | -1.460 | 0.1478 | 0.01692 | -0.0674 | 1 |
| 0.8015 | -0.644 | 0.2338 | 0.01819 | -0.0701 | 1 |
| 0.8011 | 0.148 | 0.3195 | 0.02032 | -0.0715 | 1 |
| 0.8018 | 1.066 | 0.4224 | 0.02434 | -0.0724 | 1 |
| 0.8013 | 2.021 | 0.5461 | 0.03097 | -0.0828 | 1 |
| 0.8027 | 2.873 | 0.6479 | 0.04070 | -0.0922 | 1 |
| 0.[illegible]014 | 1.826 | 0.4170 | 0.02239 | -0.0520 | 2 |
| 0.6000 | 1.733 | 0.4199 | 0.02272 | -0.0555 | 2 |
| 0.7021 | 1.378 | 0.4073 | 0.02271 | -0.0600 | 2 |
| 0.8208 | 0.888 | 0.4214 | 0.02475 | -0.0791 | 1 |
| 0.8391 | 0.787 | 0.4273 | 0.02550 | -0.0872 | 1 |
| 0.8596 | 0.539 | 0.4154 | 0.02625 | -0.0955 | 1 |
| 0.8792 | 0.467 | 0.4054 | 0.02990 | -0.0976 | 1 |

*See Figure 8.3

TABLE 8.4 SUMMARY OF TEST CONDITIONS

| M | 0.5 | 0.6 | 0.7 | 0.74 | 0.78 | 0.82 | 0.88 |
|---|---|---|---|---|---|---|---|
| Δα° | 0.1477 | 0.1409 | 0.1309 | 0.1239 | 0.1165 | 0.1125 | 0.1049 |
| $\Delta C_m$ | -0.0014 | -0.0017 | -0.0017 | -0.0017 | -0.0017 | -0.0016 | -0.0012 |

TABLE 8.5 INCIDENCE AND $C_m$ CORRECTIONS

| M | 0.5 | 0.6 | 0.7 | 0.8 | 0.85 | 0.90 |
|---|---|---|---|---|---|---|
| $\Delta C_D$ | -0.00013 | -0.00016 | -0.00023 | -0.00033 | -0.00043 | -0.00061 |

TABLE 8.6 BLOCKAGE BUOYANCY CORRECTIONS

MACH=0.800 ALPHA=-3.017 CL=-0.023 UPPER SURFACE CP VALUES. TRANSITION 1.

| X/C \ ETA= | 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.6735 | 0.5259 | 0.3838 | 0.5091 | 0.4545 | 0.4958 | 0.4081 | 0.5704 |
| 0.010 | 0.6103 | 0.2746 | 0.2044 | 0.3635 | 0.4267 | 0.4673 | 0.5003 | 0.4259 |
| 0.025 | 0.4043 | 0.0865 | 0.0828 | 0.2454 | 0.3323 | 0.4287 | 0.5091 | 0.5684 |
| 0.050 | 0.0154 | -0.2632 | -0.2547 | -0.1776 | -0.0454 | 0.0395 | 0.1389 | 0.1236 |
| 0.075 | -0.1441 | -0.3705 | -0.3358 | -0.2835 | -0.1003 | -0.0430 | 0.0065 | 0.0576 |
| 0.100 | -0.2084 | -0.4945 | -0.3959 | -0.3021 | -0.1598 | -0.0903 | -0.0520 | 0.0109 |
| 0.150 | -0.3741 | -0.5255 | -0.4415 | -0.4084 | -0.2019 | -0.1356 | -0.0353 | -0.0641 |
| 0.200 | -0.4865 | -0.5223 | -0.4710 | -0.3824 | -0.1967 | -0.1619 | -0.1204 | -0.1175 |
| 0.250 | -0.4962 | -0.4881 | -0.4567 | -0.3245 | -0.2032 | -0.1933 | -0.1584 | -0.1414 |
| 0.300 | -0.4313 | -0.4575 | -0.4201 | -0.2852 | -0.2279 | -0.1990 | -0.1806 | -0.1787 |
| 0.350 | -0.3851 | -0.4416 | -0.3679 | -0.2700 | -0.2323 | -0.2261 | -0.1938 | -0.2082 |
| 0.400 | -0.3502 | -0.3735 | -0.3265 | -0.2533 | -0.2481 | -0.2550 | -0.2207 | -0.2316 |
| 0.450 | -0.3144 | -0.3246 | -0.2819 | -0.2455 | -0.2550 | -0.2739 | -0.2378 | -0.2592 |
| 0.500 | -0.2753 | -0.2815 | -0.2505 | -0.2377 | -0.2799 | -0.2363 | -0.2573 | -0.2871 |
| 0.550 | -0.2505 | -0.2327 | -0.2256 | -0.2364 | -0.3018 | -0.3247 | -0.2533 | -0.2972 |
| 0.600 | -0.2238 | -0.1908 | -0.2006 | -0.2372 | -0.3127 | -0.3230 | -0.2790 | -0.2529 |
| 0.650 | -0.1932 | -0.1635 | -0.1830 | -0.2474 | -0.3298 | -0.3322 | -0.2002 | -0.2686 |
| 0.700 | -0.1600 | -0.1402 | -0.1781 | -0.2540 | -0.3316 | -0.3198 | -0.2670 | -0.2393 |
| 0.750 | -0.1232 | -0.1216 | -0.1735 | -0.2518 | -0.3068 | -0.2982 | -0.2423 | -0.2031 |
| 0.800 | -0.1004 | -0.1004 | -0.1592 | -0.2332 | -0.2703 | -0.2579 | -0.2106 | -0.1462 |
| 0.850 | -0.0786 | -0.0742 | -0.1258 | -0.1897 | -0.2156 | -0.2150 | -0.1474 | -0.0761 |
| 0.900 | -0.0581 | -0.0279 | -0.0492 | -0.1076 | -0.1300 | -0.1211 | -0.0844 | -0.0038 |
| 0.950 | -0.0260 | 0.0386 | 0.0446 | 0.0130 | -0.0227 | -0.0069 | 0.0206 | 0.0780 |
| 0.990 | 0.0212 | 0.1105 | 0.1109 | 0.1164 | 0.0632 | 0.0750 | 0.0615 | 0.1055 |
| 1.000 | 0.0489 | 0.1289 | 0.1544 | | 0.0919 | 0.1011 | 0.1051 | 0.1256 |

MACH=0.800 ALPHA=-3.017 CL=-0.023 LOWER SURFACE CP VALUES. TRANSITION 1.

| X/C \ ETA= | 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.6735 | 0.5259 | 0.3838 | 0.5091 | 0.4545 | 0.4958 | 0.4081 | 0.5704 |
| 0.010 | -0.1314 | -0.3907 | -0.4233 | -0.5645 | | -1.0080 | -1.0983 | -1.0217 |
| 0.025 | -0.3004 | -0.4353 | -0.4712 | -0.5671 | -0.9304 | -1.0335 | -1.1202 | -1.0046 |
| 0.050 | -0.2960 | -0.4272 | -0.4537 | -0.5454 | -0.6931 | -1.0530 | -0.9367 | |
| 0.075 | -0.2758 | -0.4083 | -0.5281 | -0.5021 | -0.5971 | -0.9169 | -0.8212 | -0.9358 |
| 0.100 | -0.2647 | -0.4375 | -0.4644 | -0.5681 | -0.5540 | -0.7069 | -0.6643 | -0.8680 |
| 0.160 | -0.2946 | -0.4320 | -0.4672 | -0.4828 | -0.5203 | -0.5462 | -0.6453 | -0.6141 |
| 0.220 | -0.3262 | -0.4614 | -0.5150 | | -0.5423 | -0.5673 | -0.6103 | -0.6598 |
| 0.280 | -0.3533 | -0.4651 | -0.5357 | -0.5616 | -0.5477 | | -0.6383 | -0.6468 |
| 0.340 | -0.3585 | -0.4491 | -0.5208 | -0.5598 | -0.5368 | -0.5086 | -0.6123 | -0.4963 |
| 0.400 | -0.3392 | -0.4067 | -0.4781 | -0.5152 | -0.5072 | -0.4443 | -0.5025 | -0.4307 |
| 0.460 | -0.3113 | -0.3457 | -0.3898 | -0.4405 | -0.3830 | -0.3423 | -0.3663 | -0.3260 |
| 0.520 | -0.2729 | -0.2872 | -0.3033 | -0.3208 | -0.2635 | -0.2175 | -0.2203 | -0.2008 |
| 0.580 | -0.2145 | -0.2105 | -0.2353 | -0.2396 | -0.1541 | -0.0918 | -0.1062 | -0.0859 |
| 0.640 | -0.1457 | -0.1424 | -0.1561 | -0.1447 | | 0.0029 | -0.0138 | 0.0085 |
| 0.700 | -0.0744 | -0.0625 | -0.0928 | -0.0594 | 0.0353 | 0.0711 | 0.0457 | 0.0698 |
| 0.760 | -0.0054 | 0.0152 | 0.0035 | 0.0165 | 0.1082 | 0.1154 | 0.0901 | 0.1159 |
| 0.820 | 0.0505 | 0.0801 | 0.0901 | 0.0879 | 0.1672 | 0.1483 | 0.1141 | 0.1503 |
| 0.880 | 0.1112 | 0.1687 | 0.1757 | 0.1590 | 0.2151 | 0.1775 | 0.1417 | 0.1731 |
| 0.940 | 0.1507 | 0.2087 | 0.2393 | 0.2029 | 0.2422 | 0.1911 | 0.1647 | 0.1727 |
| 0.990 | 0.1149 | 0.2149 | 0.2081 | 0.2008 | 0.1951 | 0.1277 | 0.1169 | 0.1173 |
| 1.000 | 0.0489 | 0.1289 | 0.1544 | | 0.0919 | 0.1011 | 0.1051 | 0.1256 |

MACH=0.800 ALPHA=-1.480 CL=0.148 UPPER SURFACE CP VALUES. TRANSITION 1.

| X/C \ ETA= | 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.7241 | 0.5855 | 0.4429 | 0.6902 | 0.6712 | 0.6789 | 0.6285 | 0.7075 |
| 0.010 | 0.4930 | 0.1287 | 0.0028 | 0.1113 | 0.1623 | 0.2422 | 0.2615 | 0.1786 |
| 0.025 | 0.2710 | -0.1051 | -0.1580 | -0.0171 | 0.0591 | 0.1968 | 0.2616 | 0.3762 |
| 0.050 | -0.1228 | -0.4797 | -0.5132 | -0.4541 | -0.3558 | -0.2462 | -0.1109 | -0.1210 |
| 0.075 | -0.2752 | -0.5439 | -0.5473 | -0.5588 | -0.3738 | -0.3008 | -0.2355 | -0.1537 |
| 0.100 | -0.3289 | -0.6814 | -0.6346 | -0.7049 | -0.4034 | -0.3003 | -0.2773 | -0.1755 |
| 0.150 | -0.5006 | -0.6978 | -0.6581 | -0.7081 | -0.3859 | -0.3202 | -0.2737 | -0.2251 |
| 0.200 | -0.5924 | -0.5717 | -0.6827 | -0.5955 | -0.3608 | -0.3246 | -0.2727 | -0.2578 |
| 0.250 | -0.7100 | -0.6188 | -0.6474 | -0.4495 | -0.3585 | -0.3379 | -0.3121 | -0.2653 |
| 0.300 | -0.5207 | -0.5857 | -0.5588 | -0.3920 | -0.3582 | -0.3313 | -0.3093 | -0.2889 |
| 0.350 | -0.4674 | -0.5439 | -0.4602 | -0.3593 | -0.3450 | -0.3508 | -0.3152 | -0.3024 |
| 0.400 | -0.4322 | -0.4654 | -0.3947 | -0.3512 | -0.3555 | -0.3582 | -0.3234 | -0.3087 |
| 0.450 | -0.3863 | -0.3931 | -0.3467 | -0.3342 | -0.3505 | -0.3691 | -0.3363 | -0.3322 |
| 0.500 | -0.3318 | -0.3309 | -0.3128 | -0.3100 | -0.3568 | -0.3921 | -0.3465 | -0.3441 |
| 0.550 | -0.3005 | -0.2786 | -0.2708 | -0.3015 | -0.3799 | -0.4114 | -0.3391 | -0.3474 |
| 0.600 | -0.2694 | -0.2339 | -0.2482 | -0.3005 | -0.3933 | -0.4076 | -0.3495 | -0.3333 |
| 0.650 | -0.2239 | -0.2005 | -0.2273 | -0.3033 | -0.4007 | -0.4002 | -0.3420 | -0.3009 |
| 0.700 | -0.1897 | -0.1080 | -0.2163 | -0.3011 | -0.3851 | -0.3762 | -0.3164 | -0.2605 |
| 0.750 | -0.1547 | -0.1452 | -0.2044 | -0.2904 | -0.3466 | -0.3406 | -0.2818 | -0.2146 |
| 0.800 | -0.1212 | -0.1212 | -0.1837 | -0.2646 | -0.3004 | -0.2890 | -0.2390 | -0.1529 |
| 0.850 | -0.0932 | -0.0884 | -0.1440 | -0.2065 | -0.2327 | -0.2337 | -0.1608 | -0.0781 |
| 0.900 | -0.0604 | -0.0360 | -0.0604 | -0.1149 | -0.1368 | -0.1310 | -0.0933 | -0.0024 |
| 0.950 | -0.0301 | 0.0356 | 0.0385 | 0.0104 | -0.0247 | -0.0133 | 0.0155 | 0.0803 |
| 0.990 | 0.0215 | 0.1100 | 0.1071 | 0.1053 | 0.0535 | 0.0634 | 0.0557 | 0.1080 |
| 1.000 | 0.0501 | 0.1277 | 0.1505 | | 0.0772 | 0.0835 | 0.0935 | 0.1232 |

MACH=0.800 ALPHA=-1.480 CL=0.148 LOWER SURFACE CP VALUES. TRANSITION 1.

| X/C \ ETA= | 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.7241 | 0.5855 | 0.4429 | 0.6902 | 0.6712 | 0.6789 | 0.6285 | 0.7075 |
| 0.010 | 0.0366 | -0.1324 | -0.1083 | -0.1204 | | -0.4564 | -0.4545 | -0.4884 |
| 0.025 | -0.1023 | -0.1835 | -0.1711 | -0.1887 | -0.3205 | -0.4742 | -0.4503 | -0.5040 |
| 0.050 | -0.1510 | -0.2568 | -0.2236 | -0.2458 | -0.3248 | -0.4433 | -0.4115 | |
| 0.075 | -0.1571 | -0.2631 | -0.3205 | -0.2377 | -0.2942 | -0.3835 | -0.3996 | -0.4248 |
| 0.100 | -0.1815 | -0.2950 | -0.2832 | -0.2815 | -0.2891 | -0.3645 | -0.4101 | -0.4582 |
| 0.180 | -0.2034 | -0.3554 | -0.3170 | -0.3117 | -0.3147 | -0.3539 | -0.4091 | -0.4687 |
| 0.220 | -0.2412 | -0.3462 | -0.3648 | | -0.3595 | -0.3330 | -0.4277 | -0.4743 |
| 0.280 | -0.2743 | -0.3858 | -0.3880 | -0.3974 | -0.3871 | | -0.4642 | -0.4918 |
| 0.340 | -0.2633 | -0.3539 | -0.3984 | -0.4213 | -0.4087 | -0.3918 | -0.4590 | -0.4495 |
| 0.400 | -0.2656 | -0.3247 | -0.3834 | -0.4003 | -0.3930 | -0.3536 | -0.4161 | -0.4038 |
| 0.460 | -0.2506 | -0.2823 | -0.3120 | -0.3502 | -0.3155 | -0.2608 | -0.3172 | -0.3138 |
| 0.520 | -0.2251 | -0.2331 | -0.2466 | -0.2634 | -0.2201 | -0.1838 | -0.1910 | -0.1974 |
| 0.580 | -0.1735 | -0.1663 | -0.1656 | -0.1907 | -0.1168 | -0.0663 | -0.0859 | -0.0871 |
| 0.640 | -0.1098 | -0.1072 | -0.1151 | -0.1060 | | 0.0298 | 0.0088 | 0.0111 |
| 0.700 | -0.0454 | -0.0348 | -0.0668 | -0.0313 | 0.0857 | 0.1073 | 0.0784 | 0.0779 |
| 0.760 | 0.0188 | 0.0377 | 0.0258 | 0.0388 | 0.1347 | 0.1634 | 0.1306 | 0.1308 |
| 0.820 | 0.0703 | 0.1063 | 0.1073 | 0.1070 | 0.1953 | 0.2000 | 0.1628 | 0.1695 |
| 0.880 | 0.1265 | 0.1642 | 0.1917 | 0.1784 | 0.2415 | 0.2265 | 0.1878 | 0.1939 |
| 0.940 | 0.1643 | 0.2164 | 0.2336 | 0.2205 | 0.2221 | 0.2293 | 0.1958 | 0.1978 |
| 0.990 | 0.1218 | 0.2213 | 0.2102 | 0.2078 | 0.1360 | 0.1230 | 0.1533 | 0.1144 |
| 1.000 | 0.0501 | 0.1277 | 0.1505 | | 0.0772 | 0.0835 | 0.0935 | 0.1232 |

TABLE 8.7 M100 WING PRESSURE DISTRIBUTIONS

MACH=0.801 ALPHA=-0.844 CL=0.234 UPPER SURFACE CP VALUES. TRANSITION 1.

| X/C | ETA= 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.7444 | 0.5704 | 0.4488 | 0.7141 | 0.7232 | 0.7222 | 0.7024 | 0.7407 |
| 0.010 | 0.4215 | 0.0411 | -0.1565 | -0.0373 | -0.0131 | 0.0848 | 0.0810 | 0.0007 |
| 0.025 | 0.1946 | -0.1894 | -0.2973 | -0.1659 | -0.1026 | 0.0237 | 0.1006 | 0.2337 |
| 0.050 | -0.1978 | -0.5908 | -0.6234 | -0.6237 | -0.5404 | -0.4153 | -0.2785 | -0.2721 |
| 0.075 | -0.3433 | -0.6260 | -0.7147 | -0.6813 | -0.5797 | -0.4522 | -0.3928 | -0.2867 |
| 0.100 | -0.3875 | -0.7692 | -0.8282 | -0.8567 | -0.5385 | -0.4708 | -0.4178 | -0.3063 |
| 0.150 | -0.5577 | -0.8150 | -0.8023 | -0.8389 | -0.5049 | -0.4533 | -0.3833 | -0.3285 |
| 0.200 | -0.6404 | -0.8282 | -0.7444 | -0.8243 | -0.4511 | -0.4113 | -0.3678 | -0.3428 |
| 0.250 | -0.7532 | -0.7157 | -0.7461 | -0.7611 | -0.4306 | -0.4224 | -0.3955 | -0.3375 |
| 0.300 | -0.6425 | -0.5618 | -0.6654 | -0.3353 | -0.4205 | -0.4051 | -0.3784 | -0.3499 |
| 0.350 | -0.5254 | -0.5777 | -0.5894 | -0.3741 | -0.4122 | -0.4082 | -0.3859 | -0.3555 |
| 0.400 | -0.4670 | -0.5150 | -0.4178 | -0.3794 | -0.4097 | -0.4227 | -0.3859 | -0.3584 |
| 0.450 | -0.4156 | -0.4241 | -0.3675 | -0.3637 | -0.3905 | -0.4268 | -0.3833 | -0.3672 |
| 0.500 | -0.3666 | -0.3586 | -0.3289 | -0.3488 | -0.4023 | -0.4368 | -0.3340 | -0.3747 |
| 0.550 | -0.3331 | -0.2990 | -0.2953 | -0.3391 | -0.4182 | -0.4537 | -0.3888 | -0.3688 |
| 0.600 | -0.2893 | -0.2517 | -0.2668 | -0.3263 | -0.4272 | -0.4473 | -0.3827 | -0.3519 |
| 0.650 | -0.2472 | -0.2144 | -0.2431 | -0.3276 | -0.4290 | -0.4318 | -0.3697 | -0.3126 |
| 0.700 | -0.2085 | -0.1812 | -0.2323 | -0.3306 | -0.4076 | -0.4013 | -0.3453 | -0.2698 |
| 0.750 | -0.1691 | -0.1563 | -0.2193 | -0.3153 | -0.3606 | -0.3612 | -0.3033 | -0.2210 |
| 0.800 | -0.1307 | -0.1290 | -0.1945 | -0.2761 | -0.3053 | -0.3021 | -0.2506 | -0.1564 |
| 0.850 | -0.1008 | -0.0942 | -0.1477 | -0.2132 | -0.2329 | -0.2390 | -0.1655 | -0.0737 |
| 0.900 | -0.0721 | -0.0393 | -0.0621 | -0.1163 | -0.1348 | -0.1312 | -0.0944 | -0.0026 |
| 0.950 | -0.0238 | 0.0354 | 0.0369 | 0.0086 | -0.0218 | -0.0140 | 0.0146 | 0.0805 |
| 0.990 | 0.0243 | 0.1074 | 0.1054 | 0.1005 | 0.0469 | 0.0588 | 0.0536 | 0.1061 |
| 1.000 | 0.0536 | 0.1249 | 0.1468 | | 0.0661 | 0.0753 | 0.0873 | 0.1206 |

MACH=0.801 ALPHA=-0.844 CL=0.234 LOWER SURFACE CP VALUES. TRANSITION 1.

| X/C | ETA= 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.7444 | 0.5704 | 0.4488 | 0.7141 | 0.7232 | 0.7222 | 0.7024 | 0.7407 |
| 0.010 | 0.1283 | -0.0305 | 0.0228 | 0.0339 | | -0.2042 | -0.1809 | -0.2138 |
| 0.025 | -0.0245 | -0.0904 | -0.0706 | -0.0178 | -0.0671 | -0.2095 | -0.2248 | -0.2507 |
| 0.050 | -0.0896 | -0.1784 | -0.1377 | -0.1202 | -0.1569 | -0.2697 | -0.2390 | |
| 0.075 | -0.1007 | -0.1886 | -0.2197 | -0.1428 | -0.1797 | -0.2552 | -0.2428 | -0.2861 |
| 0.100 | -0.1093 | -0.2258 | -0.2001 | -0.1837 | -0.1776 | -0.2409 | -0.2865 | -0.3379 |
| 0.160 | -0.1526 | -0.2999 | -0.2554 | -0.2298 | -0.2222 | -0.2627 | -0.3133 | -0.3646 |
| 0.220 | -0.1989 | -0.2908 | -0.2997 | | -0.2861 | -0.3088 | -0.3359 | -0.3948 |
| 0.280 | -0.2408 | -0.3150 | -0.3247 | -0.3237 | -0.3044 | | -0.3855 | -0.4265 |
| 0.340 | -0.2488 | -0.3065 | -0.3462 | -0.3573 | -0.3362 | -0.3316 | -0.3971 | -0.3986 |
| 0.400 | -0.2324 | -0.2838 | -0.3319 | -0.3468 | -0.3419 | -0.3147 | -0.3656 | -0.3713 |
| 0.460 | -0.2242 | -0.2491 | -0.2670 | -0.3089 | -0.2768 | -0.2526 | -0.2817 | -0.2998 |
| 0.520 | -0.1971 | -0.2070 | -0.2148 | -0.2310 | -0.1923 | -0.1584 | -0.1688 | -0.1903 |
| 0.580 | -0.1485 | -0.1465 | -0.1644 | -0.1645 | -0.0978 | -0.0518 | -0.0698 | -0.0836 |
| 0.640 | -0.0905 | -0.0909 | -0.1003 | -0.0847 | | 0.0436 | 0.0228 | 0.0135 |
| 0.700 | -0.0309 | -0.0208 | -0.0534 | -0.0174 | 0.0703 | 0.1225 | 0.0325 | 0.0830 |
| 0.760 | 0.0306 | 0.0493 | 0.0354 | 0.0501 | 0.1471 | 0.1800 | 0.1491 | 0.1365 |
| 0.820 | 0.0799 | 0.1134 | 0.1161 | 0.1153 | 0.2076 | 0.2194 | 0.1800 | 0.1796 |
| 0.880 | 0.1353 | 0.1922 | 0.2002 | 0.1647 | 0.2525 | 0.2409 | 0.2026 | 0.2040 |
| 0.940 | 0.1712 | 0.2244 | 0.2617 | 0.2275 | 0.2699 | 0.2412 | 0.2070 | 0.1918 |
| 0.930 | 0.1269 | 0.2232 | 0.2105 | 0.2103 | 0.1974 | 0.1183 | 0.1568 | 0.1071 |
| 1.000 | 0.0536 | 0.1249 | 0.1468 | | 0.0661 | 0.0753 | 0.0873 | 0.1206 |

MACH=0.801 ALPHA=0.148 CL=0.320 UPPER SURFACE CP VALUES. TRANSITION 1.

| X/C | ETA= 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.7547 | 0.5735 | 0.4394 | 0.7220 | 0.7355 | 0.7483 | 0.7362 | 0.7539 |
| 0.010 | 0.3597 | -0.0394 | -0.2493 | -0.1936 | -0.2011 | -0.0813 | -0.1252 | -0.2097 |
| 0.025 | 0.1289 | -0.2834 | -0.4823 | -0.2933 | -0.2846 | -0.1456 | -0.0833 | 0.0875 |
| 0.050 | -0.2686 | -0.6968 | -0.7550 | -0.7741 | -0.7350 | -0.6202 | -0.4346 | -0.4641 |
| 0.075 | -0.4158 | -0.7132 | -0.8576 | -0.8256 | -0.8277 | -0.6502 | -0.5899 | -0.4506 |
| 0.100 | -0.4536 | -0.8194 | -0.9312 | -0.9693 | -0.9269 | -0.8294 | -0.5846 | -0.4350 |
| 0.150 | -0.6147 | -0.8866 | -0.9591 | -1.0739 | -0.7622 | -0.5781 | -0.4959 | -0.4362 |
| 0.200 | -0.6739 | -0.9287 | -0.9345 | -1.0598 | -0.3816 | -0.5166 | -0.4737 | -0.4479 |
| 0.250 | -0.7654 | -0.9345 | -0.9205 | -1.0020 | -0.4409 | -0.4987 | -0.5164 | -0.4182 |
| 0.300 | -0.7433 | -0.8218 | -0.7581 | -0.5954 | -0.4666 | -0.4703 | -0.4528 | -0.4155 |
| 0.350 | -0.6549 | -0.5665 | -0.6025 | -0.3014 | -0.4626 | -0.4800 | -0.4412 | -0.4038 |
| 0.400 | -0.5363 | -0.5453 | -0.4448 | -0.3285 | -0.4794 | -0.5005 | -0.4415 | -0.4020 |
| 0.450 | -0.4475 | -0.4541 | -0.3776 | -0.3520 | -0.4588 | -0.4744 | -0.4340 | -0.4042 |
| 0.500 | -0.3305 | -0.3795 | -0.3382 | -0.3522 | -0.4504 | -0.4904 | -0.4330 | -0.3392 |
| 0.550 | -0.3499 | -0.3198 | -0.3059 | -0.3500 | -0.4641 | -0.5013 | -0.4236 | -0.3312 |
| 0.600 | -0.3070 | -0.2685 | -0.2770 | -0.3480 | -0.4641 | -0.4806 | -0.4145 | -0.3698 |
| 0.650 | -0.2617 | -0.2260 | -0.2544 | -0.3453 | -0.4470 | -0.4587 | -0.3940 | -0.3237 |
| 0.700 | -0.2185 | -0.1917 | -0.2420 | -0.3434 | -0.4167 | -0.4212 | -0.3605 | -0.2765 |
| 0.750 | -0.1775 | -0.1643 | -0.2276 | -0.3309 | -0.3621 | -0.3738 | -0.3131 | -0.2256 |
| 0.800 | -0.1374 | -0.1333 | -0.1995 | -0.2843 | -0.2995 | -0.3076 | -0.2565 | -0.1577 |
| 0.850 | -0.1051 | -0.0964 | -0.1531 | -0.2197 | -0.2200 | -0.2402 | -0.1672 | -0.0807 |
| 0.900 | -0.0756 | -0.0403 | -0.0654 | -0.1238 | -0.1197 | -0.1268 | -0.0948 | -0.0037 |
| 0.950 | -0.0304 | 0.0358 | 0.0365 | 0.0025 | -0.0201 | -0.0133 | 0.0125 | 0.0781 |
| 0.990 | 0.0247 | 0.1068 | 0.1061 | 0.1011 | 0.0336 | 0.0532 | 0.0480 | 0.1039 |
| 1.000 | 0.0535 | 0.1228 | 0.1489 | | 0.0460 | 0.0665 | 0.0794 | 0.1175 |

MACH=0.801 ALPHA=0.148 CL=0.320 LOWER SURFACE CP VALUES. TRANSITION 1.

| X/C | ETA= 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.7547 | 0.5735 | 0.4394 | 0.7220 | 0.7355 | 0.7483 | 0.7362 | 0.7539 |
| 0.010 | 0.2004 | 0.0790 | 0.1294 | 0.1747 | | 0.0032 | 0.0029 | -0.0240 |
| 0.025 | 0.0474 | 0.0094 | 0.0442 | 0.1112 | 0.0774 | -0.0148 | -0.0024 | -0.0851 |
| 0.050 | -0.0158 | -0.1040 | -0.0526 | -0.0144 | -0.0333 | -0.1286 | -0.0890 | |
| 0.075 | -0.0468 | -0.1205 | -0.1551 | -0.0464 | -0.0629 | -0.1385 | -0.1295 | -0.1641 |
| 0.100 | -0.0626 | -0.1598 | -0.1271 | -0.0963 | -0.0901 | -0.1469 | -0.1771 | -0.2360 |
| 0.160 | -0.1162 | -0.2432 | -0.1865 | -0.1530 | -0.1451 | -0.1779 | -0.2189 | -0.2705 |
| 0.220 | -0.1608 | -0.2451 | -0.2426 | | -0.2071 | -0.2358 | -0.2547 | -0.3132 |
| 0.280 | -0.2007 | -0.2681 | -0.2756 | -0.2687 | -0.2484 | | -0.3131 | -0.3608 |
| 0.340 | -0.2165 | -0.2645 | -0.2902 | -0.2983 | -0.2797 | -0.2742 | -0.3304 | -0.3491 |
| 0.400 | -0.2064 | -0.2522 | -0.2891 | -0.2902 | -0.2955 | -0.2688 | -0.3149 | -0.3327 |
| 0.460 | -0.1948 | -0.2182 | -0.2348 | -0.2645 | -0.2371 | -0.2155 | -0.2485 | -0.2774 |
| 0.520 | -0.1738 | -0.1771 | -0.1878 | -0.1990 | -0.1623 | -0.1319 | -0.1446 | -0.1791 |
| 0.580 | -0.1311 | -0.1227 | -0.1401 | -0.1357 | -0.0765 | -0.0343 | -0.0526 | -0.0777 |
| 0.640 | -0.0762 | -0.0732 | -0.0798 | -0.0645 | | 0.0546 | 0.0366 | 0.0187 |
| 0.700 | -0.0166 | -0.0047 | -0.0385 | 0.0000 | 0.0901 | 0.1349 | 0.1057 | 0.0869 |
| 0.760 | 0.0439 | 0.0608 | 0.0488 | 0.0641 | 0.1557 | 0.1960 | 0.1630 | 0.1436 |
| 0.820 | 0.0900 | 0.1236 | 0.1258 | 0.1280 | 0.2146 | 0.2340 | 0.1933 | 0.1659 |
| 0.880 | 0.1454 | 0.2010 | 0.2065 | 0.1955 | 0.2577 | 0.2624 | 0.2165 | 0.2092 |
| 0.940 | 0.1783 | 0.2307 | 0.2698 | 0.2364 | 0.2719 | 0.2495 | 0.2178 | 0.1933 |
| 0.990 | 0.1915 | 0.2297 | 0.2146 | 0.2180 | 0.1901 | 0.1136 | 0.1575 | 0.0377 |
| 1.000 | 0.0535 | 0.1228 | 0.1469 | | 0.0460 | 0.0665 | 0.0794 | 0.1175 |

TABLE 8.7 (contd) M100 WING PRESSURE DISTRIBUTIONS

MACH=0.802 ALPHA=1.066 CL=0.422 UPPER SURFACE CP VALUES. TRANSITION 1.

| X/C \ ETA= | 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.7583 | 0.5573 | 0.4197 | 0.7110 | 0.7253 | 0.7442 | 0.7457 | 0.7342 |
| 0.010 | 0.2798 | -0.1440 | -0.4157 | -0.3449 | -0.3709 | -0.2841 | -0.3440 | -0.4783 |
| 0.025 | 0.0435 | -0.4003 | -0.5562 | -0.4316 | -0.4669 | -0.3610 | -0.3111 | -0.1299 |
| 0.050 | -0.3520 | -0.7974 | -0.8555 | -0.9353 | -0.8523 | -0.9078 | -0.6551 | -0.7025 |
| 0.075 | -0.5099 | -0.8290 | -1.0038 | -0.9751 | -0.9687 | -0.9355 | -0.8717 | -0.8704 |
| 0.100 | -0.5274 | -0.9496 | -1.0561 | -1.0986 | -1.0709 | -0.9713 | -0.9098 | -0.8481 |
| 0.150 | -0.6773 | -0.9831 | -1.1162 | -1.1913 | -1.0701 | -0.8694 | -0.7115 | -0.6134 |
| 0.200 | -0.7582 | -1.0023 | -1.1202 | -1.2442 | -1.0282 | -0.8002 | -0.5524 | -0.5487 |
| 0.250 | -0.8285 | -1.0177 | -1.0728 | -1.1921 | -0.9449 | -0.4522 | -0.6257 | -0.4964 |
| 0.300 | -0.8285 | -0.9718 | -1.0398 | -1.1575 | -0.6538 | -0.5154 | -0.5764 | -0.4772 |
| 0.350 | -0.7686 | -0.8270 | -0.9744 | -1.0578 | -0.3192 | -0.5060 | -0.5086 | -0.4590 |
| 0.400 | -0.6512 | -0.5791 | -0.5243 | -0.3538 | -0.3778 | -0.5448 | -0.4955 | -0.4417 |
| 0.450 | -0.5663 | -0.4807 | -0.3460 | -0.2729 | -0.4104 | -0.5477 | -0.4848 | -0.4325 |
| 0.500 | -0.4416 | -0.3967 | -0.3194 | -0.2780 | -0.4420 | -0.5500 | -0.4768 | -0.4233 |
| 0.550 | -0.3872 | -0.3346 | -0.2958 | -0.3008 | -0.4709 | -0.5444 | -0.4574 | -0.4097 |
| 0.600 | -0.3315 | -0.2803 | -0.2714 | -0.3121 | -0.4764 | -0.4987 | -0.4359 | -0.3810 |
| 0.650 | -0.2606 | -0.2354 | -0.2515 | -0.3159 | -0.4706 | -0.4698 | -0.4088 | -0.3329 |
| 0.700 | -0.2320 | -0.2019 | -0.2408 | -0.3265 | -0.4383 | -0.4192 | -0.3693 | -0.2835 |
| 0.750 | -0.1877 | -0.1712 | -0.2270 | -0.3179 | -0.3786 | -0.3523 | -0.3166 | -0.2295 |
| 0.800 | -0.1458 | -0.1372 | -0.2005 | -0.2790 | -0.3148 | -0.2919 | -0.2522 | -0.1592 |
| 0.850 | -0.1090 | -0.0978 | -0.1528 | -0.2170 | -0.2331 | -0.2151 | -0.1537 | -0.0803 |
| 0.900 | -0.0755 | -0.0415 | -0.0626 | -0.1242 | -0.1309 | -0.1081 | -0.0849 | -0.0043 |
| 0.950 | -0.0264 | 0.0355 | 0.0401 | 0.0019 | -0.0241 | -0.0107 | 0.0163 | 0.0750 |
| 0.990 | 0.0304 | 0.1081 | 0.1078 | 0.1052 | 0.0416 | 0.0333 | 0.0462 | 0.0990 |
| 1.000 | 0.0600 | 0.1244 | 0.1485 | | 0.0583 | 0.0380 | 0.0700 | 0.1118 |

MACH=0.802 ALPHA=1.066 CL=0.422 LOWER SURFACE CP VALUES. TRANSITION 1.

| X/C \ ETA= | 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.7583 | 0.5573 | 0.4197 | 0.7110 | 0.7253 | 0.7442 | 0.7457 | 0.7342 |
| 0.010 | 0.2959 | 0.1660 | 0.2285 | 0.3037 | | 0.1939 | 0.1910 | 0.1778 |
| 0.025 | 0.1365 | 0.0993 | 0.1461 | 0.2390 | 0.2113 | 0.1731 | 0.1744 | 0.1441 |
| 0.050 | 0.0390 | -0.0217 | 0.0411 | 0.0524 | 0.0723 | 0.0158 | 0.0618 | |
| 0.075 | 0.0149 | -0.0477 | -0.0740 | 0.0465 | 0.0403 | -0.0101 | 0.0057 | -0.0478 |
| 0.100 | -0.0034 | -0.0937 | -0.0581 | -0.0211 | 0.0043 | -0.0312 | -0.0615 | -0.1187 |
| 0.160 | -0.0698 | -0.1818 | -0.1151 | -0.0817 | -0.0680 | -0.0850 | -0.1284 | -0.1781 |
| 0.220 | -0.1205 | -0.1869 | -0.1755 | | -0.1305 | -0.1498 | -0.1728 | -0.2370 |
| 0.280 | -0.1563 | -0.2154 | -0.2153 | -0.2008 | -0.1682 | | -0.2382 | -0.2882 |
| 0.340 | -0.1762 | -0.2188 | -0.2343 | -0.2319 | -0.2092 | -0.2116 | -0.2683 | -0.2906 |
| 0.400 | -0.1725 | -0.2115 | -0.2309 | -0.2348 | -0.2336 | -0.2106 | -0.2637 | -0.2930 |
| 0.460 | -0.1613 | -0.1809 | -0.1875 | -0.2173 | -0.1922 | -0.1711 | -0.2061 | -0.2495 |
| 0.520 | -0.1396 | -0.1456 | -0.1493 | -0.1574 | -0.1288 | -0.1032 | -0.1159 | -0.1631 |
| 0.580 | -0.1013 | -0.0966 | -0.1112 | -0.1067 | -0.0488 | -0.0130 | -0.0329 | -0.0698 |
| 0.640 | -0.0520 | -0.0504 | -0.0574 | -0.0406 | | 0.0693 | 0.0505 | 0.0223 |
| 0.700 | 0.0010 | 0.0112 | -0.0204 | 0.0213 | 0.1075 | 0.1430 | 0.1177 | 0.0906 |
| 0.760 | 0.0579 | 0.0738 | 0.0617 | 0.0825 | 0.1712 | 0.2045 | 0.1736 | 0.1462 |
| 0.820 | 0.1022 | 0.1358 | 0.1368 | 0.1413 | 0.2291 | 0.2441 | 0.2044 | 0.1887 |
| 0.880 | 0.1544 | 0.2107 | 0.2181 | 0.2091 | 0.2718 | 0.2632 | 0.2261 | 0.2134 |
| 0.940 | 0.1861 | 0.2382 | 0.2732 | 0.2503 | 0.2653 | 0.2402 | 0.2238 | 0.1942 |
| 0.990 | 0.1370 | 0.2341 | 0.2192 | 0.2297 | 0.2025 | 0.0915 | 0.1557 | 0.0878 |
| 1.000 | 0.0600 | 0.1244 | 0.1485 | | 0.0583 | 0.0380 | 0.0700 | 0.1118 |

MACH=0.801 ALPHA=2.021 CL=0.546 UPPER SURFACE CP VALUES. TRANSITION 1.

| X/C \ ETA= | 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.7543 | 0.5398 | 0.3862 | 0.6716 | 0.7075 | 0.7024 | 0.7241 | 0.6692 |
| 0.010 | 0.1998 | -0.2492 | -0.5809 | -0.4973 | -0.5732 | -0.4711 | -0.5733 | -0.7708 |
| 0.025 | -0.0543 | -0.5445 | -0.7209 | -0.6008 | -0.6437 | -0.5321 | -0.5672 | -0.3943 |
| 0.050 | -0.4685 | -0.9171 | -0.9776 | -1.0946 | -1.0295 | -1.0592 | -0.8508 | -0.9913 |
| 0.075 | -0.5858 | -0.9611 | -1.1268 | -1.1452 | -1.1141 | -1.1505 | -1.0555 | -1.0681 |
| 0.100 | -0.5954 | -1.0475 | -1.2004 | -1.2232 | -1.1900 | -1.1848 | -1.1188 | -1.0665 |
| 0.150 | -0.7497 | -1.0852 | -1.2225 | -1.3098 | -1.1891 | -1.1381 | -1.1407 | -0.9883 |
| 0.200 | -0.8202 | -1.0692 | -1.2503 | -1.3568 | -1.1747 | -1.1265 | -1.1021 | -0.8979 |
| 0.250 | -0.8795 | -1.1080 | -1.2545 | -1.3638 | -1.1727 | -1.1291 | -0.9790 | -0.5833 |
| 0.300 | -0.8699 | -1.1074 | -1.2064 | -1.2884 | -1.1325 | -1.0370 | -0.9378 | -0.4388 |
| 0.350 | -0.8605 | -1.0137 | -1.1520 | -1.2642 | -1.0669 | -0.9800 | -0.3963 | -0.4595 |
| 0.400 | -0.7546 | -0.8892 | -1.1190 | -1.2002 | -1.0382 | -0.5144 | -0.4060 | -0.4437 |
| 0.450 | -0.7235 | -0.5968 | -0.7126 | -0.7298 | -0.3339 | -0.3625 | -0.4195 | -0.4447 |
| 0.500 | -0.5605 | -0.4360 | -0.2769 | -0.4073 | -0.3261 | -0.4678 | -0.4432 | -0.4399 |
| 0.550 | -0.4312 | -0.3528 | -0.2533 | -0.2719 | -0.3591 | -0.5142 | -0.4537 | -0.4203 |
| 0.600 | -0.3671 | -0.2919 | -0.2405 | -0.2545 | -0.3913 | -0.4934 | -0.4453 | -0.3923 |
| 0.650 | -0.3070 | -0.2448 | -0.2283 | -0.2609 | -0.4012 | -0.4768 | -0.4178 | -0.3430 |
| 0.700 | -0.2467 | -0.2067 | -0.2218 | -0.2696 | -0.3791 | -0.4313 | -0.3792 | -0.2914 |
| 0.750 | -0.1980 | -0.1740 | -0.2077 | -0.2724 | -0.3430 | -0.3781 | -0.3253 | -0.2353 |
| 0.800 | -0.1519 | -0.1387 | -0.1858 | -0.2398 | -0.2899 | -0.3078 | -0.2622 | -0.1630 |
| 0.850 | -0.1107 | -0.0960 | -0.1420 | -0.1852 | -0.2145 | -0.2350 | -0.1626 | -0.0849 |
| 0.900 | -0.0751 | -0.0358 | -0.0577 | -0.1084 | -0.1187 | -0.1241 | -0.0921 | -0.0088 |
| 0.950 | -0.0217 | 0.0400 | 0.0410 | 0.0044 | -0.0233 | -0.0090 | 0.0178 | 0.0698 |
| 0.990 | 0.0361 | 0.1109 | 0.1080 | 0.1046 | 0.0419 | 0.0539 | 0.0490 | 0.0930 |
| 1.000 | 0.0644 | 0.1222 | 0.1520 | | 0.0561 | 0.0647 | 0.0741 | 0.1009 |

MACH=0.801 ALPHA=2.021 CL=0.546 LOWER SURFACE CP VALUES. TRANSITION 1.

| X/C \ ETA= | 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.7543 | 0.5398 | 0.3862 | 0.6716 | 0.7075 | 0.7024 | 0.7241 | 0.6692 |
| 0.010 | 0.3742 | 0.2771 | 0.3176 | 0.4065 | | 0.3433 | 0.3555 | 0.3458 |
| 0.025 | 0.2269 | 0.2001 | 0.2445 | 0.3379 | 0.3375 | 0.3028 | 0.3333 | 0.3198 |
| 0.050 | 0.1153 | 0.0597 | 0.1284 | 0.1966 | 0.1749 | 0.1410 | 0.1938 | |
| 0.075 | 0.0801 | 0.0167 | 0.0246 | 0.1309 | 0.1237 | 0.1106 | 0.1317 | 0.0687 |
| 0.100 | 0.0550 | -0.0223 | 0.0123 | 0.0584 | 0.0003 | 0.0642 | 0.0453 | -0.0072 |
| 0.160 | -0.0168 | -0.1172 | -0.0463 | -0.0067 | -0.0013 | -0.0042 | -0.0333 | -0.0752 |
| 0.220 | -0.0730 | -0.1341 | -0.1073 | | -0.0610 | -0.0609 | -0.0770 | -0.1462 |
| 0.280 | -0.1121 | -0.1614 | -0.1541 | -0.1308 | -0.0960 | | -0.1480 | -0.2102 |
| 0.340 | -0.1312 | -0.1733 | -0.1777 | -0.1674 | -0.1446 | -0.1414 | -0.1654 | -0.2247 |
| 0.400 | -0.1333 | -0.1660 | -0.1790 | -0.1811 | -0.1805 | -0.1502 | -0.1876 | -0.2398 |
| 0.460 | -0.1287 | -0.1414 | -0.1423 | -0.1693 | -0.1446 | -0.1208 | -0.1474 | -0.2142 |
| 0.520 | -0.1070 | -0.1154 | -0.1154 | -0.1164 | -0.0852 | -0.0611 | -0.0712 | -0.1381 |
| 0.580 | -0.0739 | -0.0703 | -0.0808 | -0.0688 | -0.0165 | 0.0230 | 0.0020 | -0.0543 |
| 0.640 | -0.0307 | -0.0253 | -0.0284 | -0.0112 | | 0.1011 | 0.0786 | 0.0300 |
| 0.700 | 0.0217 | 0.0344 | 0.0005 | 0.0444 | 0.1284 | 0.1709 | 0.1393 | 0.0935 |
| 0.760 | 0.0778 | 0.0912 | 0.0809 | 0.0933 | 0.1802 | 0.2308 | 0.1939 | 0.1488 |
| 0.820 | 0.1165 | 0.1496 | 0.1526 | 0.1537 | 0.2446 | 0.2707 | 0.2226 | 0.1914 |
| 0.880 | 0.1688 | 0.2203 | 0.2308 | 0.2198 | 0.2863 | 0.2956 | 0.2418 | 0.2159 |
| 0.940 | 0.1978 | 0.2438 | 0.2899 | 0.2621 | 0.2983 | 0.2726 | 0.2384 | 0.1925 |
| 0.990 | 0.1452 | 0.2374 | 0.2236 | 0.2374 | 0.2128 | 0.1255 | 0.1675 | 0.0757 |
| 1.000 | 0.0644 | 0.1222 | 0.1520 | | 0.0581 | 0.0647 | 0.0741 | 0.1009 |

TABLE 8.7 (contd) M100 WING PRESSURE DISTRIBUTIONS

MACH=0.803 ALPHA=2.873 CL=0.648 UPPER SURFACE CP VALUES. TRANSITION 1.

| X/C | ETA= 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.7454 | 0.5078 | 0.3453 | 0.8146 | 0.6558 | 0.6558 | 0.6870 | 0.5994 |
| 0.010 | 0.1266 | -0.3528 | -0.7073 | -0.6384 | -0.7217 | -0.5782 | -0.7383 | -0.9097 |
| 0.025 | -0.1182 | -0.6811 | -0.8643 | -0.7091 | -0.7774 | -0.8524 | -0.7478 | -0.8863 |
| 0.050 | -0.5508 | -1.0031 | -1.0516 | -1.1838 | -1.1507 | -1.1653 | -0.9909 | -1.1562 |
| 0.075 | -0.6563 | -1.0269 | -1.2070 | -1.2548 | -1.2324 | -1.2413 | -1.1540 | -1.2068 |
| 0.100 | -0.6042 | -1.1291 | -1.2907 | -1.3349 | -1.2821 | -1.2850 | -1.2248 | -1.2068 |
| 0.150 | -0.8066 | -1.1870 | -1.3428 | -1.4012 | -1.2832 | -1.2717 | -1.2428 | -1.1840 |
| 0.200 | -0.8626 | -1.1708 | -1.3602 | -1.4482 | -1.2728 | -1.2591 | -1.2324 | -1.1599 |
| 0.250 | -0.9521 | -1.1489 | -1.3444 | -1.4375 | -1.2514 | -1.2241 | -1.2029 | -1.0863 |
| 0.300 | -0.9184 | -1.1731 | -1.3044 | -1.4115 | -1.2550 | -1.2099 | -1.1978 | -1.0384 |
| 0.350 | -0.9179 | -1.1278 | -1.2882 | -1.3629 | -1.2365 | -1.1849 | -1.1923 | -0.5431 |
| 0.400 | -0.8178 | -1.0134 | -1.2380 | -1.3338 | -1.1773 | -1.1452 | -1.1219 | -0.3443 |
| 0.450 | -0.7980 | -0.8274 | -1.1445 | -1.0643 | -0.9774 | -0.9391 | -0.6059 | -0.3232 |
| 0.500 | -0.7206 | -0.5145 | -0.5998 | -0.7463 | -0.5816 | -0.6280 | -0.4552 | -0.3439 |
| 0.550 | -0.5312 | -0.3881 | -0.2873 | -0.5304 | -0.4222 | -0.4870 | -0.3718 | -0.3429 |
| 0.600 | -0.4031 | -0.3088 | -0.2158 | -0.3533 | -0.3344 | -0.3827 | -0.3514 | -0.3491 |
| 0.650 | -0.3245 | -0.2528 | -0.1987 | -0.2824 | -0.3198 | -0.3717 | -0.3357 | -0.3189 |
| 0.700 | -0.2547 | -0.2044 | -0.1912 | -0.2410 | -0.3004 | -0.3487 | -0.3185 | -0.2742 |
| 0.750 | -0.2012 | -0.1692 | -0.1884 | -0.2199 | -0.2644 | -0.3321 | -0.2844 | -0.2263 |
| 0.800 | -0.1508 | -0.1350 | -0.1698 | -0.1909 | -0.2281 | -0.2806 | -0.2317 | -0.1634 |
| 0.850 | -0.1105 | -0.0951 | -0.1263 | -0.1470 | -0.1630 | -0.2198 | -0.1530 | -0.0910 |
| 0.900 | -0.0736 | -0.0354 | -0.0483 | -0.0831 | -0.0962 | -0.1208 | -0.0893 | -0.0184 |
| 0.950 | -0.0187 | 0.0404 | 0.0458 | 0.0103 | -0.0316 | -0.0122 | 0.0122 | 0.0596 |
| 0.990 | 0.0381 | 0.1088 | 0.1098 | 0.0901 | 0.0198 | 0.0607 | 0.0489 | 0.0878 |
| 1.000 | 0.0853 | 0.1238 | 0.1521 | | 0.0110 | 0.0788 | 0.0793 | 0.0995 |

MACH=0.803 ALPHA=2.873 CL=0.648 LOWER SURFACE CP VALUES. TRANSITION 1.

| X/C | ETA= 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.7454 | 0.5078 | 0.3453 | 0.8146 | 0.6558 | 0.6558 | 0.6870 | 0.5994 |
| 0.010 | 0.4345 | 0.3450 | 0.3367 | 0.4859 | | 0.4310 | 0.4359 | 0.4347 |
| 0.025 | 0.2973 | 0.2852 | 0.3074 | 0.4178 | 0.4213 | 0.3893 | 0.4295 | 0.4053 |
| 0.050 | 0.1786 | 0.1320 | 0.1807 | 0.2558 | 0.2497 | 0.2185 | 0.2639 | |
| 0.075 | 0.1322 | 0.0813 | 0.1009 | 0.1970 | 0.1947 | 0.1770 | 0.1981 | 0.1418 |
| 0.100 | 0.1006 | 0.0271 | 0.0764 | 0.1228 | 0.1370 | 0.1328 | 0.1215 | 0.0564 |
| 0.160 | 0.0316 | -0.0650 | 0.0060 | 0.0550 | 0.0498 | 0.0542 | 0.0357 | -0.0155 |
| 0.220 | -0.0300 | -0.0860 | -0.0588 | | -0.0214 | -0.0205 | -0.0211 | -0.0942 |
| 0.280 | -0.0744 | -0.1178 | -0.1068 | -0.0842 | -0.0555 | | -0.0935 | -0.1631 |
| 0.340 | -0.0993 | -0.1341 | -0.1345 | -0.1165 | -0.1082 | -0.1001 | -0.1918 | -0.1787 |
| 0.400 | -0.1032 | -0.1324 | -0.1467 | -0.1345 | -0.1363 | -0.1107 | -0.1455 | -0.1993 |
| 0.460 | -0.0932 | -0.1088 | -0.1119 | -0.1317 | -0.1115 | -0.0816 | -0.1110 | -0.1859 |
| 0.520 | -0.0865 | -0.0843 | -0.0829 | -0.0882 | -0.0652 | -0.0274 | -0.0390 | -0.1202 |
| 0.580 | -0.0548 | -0.0469 | -0.0555 | -0.0457 | -0.0034 | 0.0469 | 0.0276 | -0.0461 |
| 0.640 | -0.0104 | -0.0098 | -0.0123 | 0.0051 | | 0.1199 | 0.0978 | 0.0350 |
| 0.700 | 0.0372 | 0.0488 | 0.0142 | 0.0573 | 0.1345 | 0.1872 | 0.1579 | 0.0973 |
| 0.760 | 0.0881 | 0.1017 | 0.0919 | 0.1112 | 0.1919 | 0.2467 | 0.2097 | 0.1513 |
| 0.820 | 0.1278 | 0.1587 | 0.1602 | 0.1637 | 0.2455 | 0.2848 | 0.2335 | 0.1935 |
| 0.880 | 0.1774 | 0.2320 | 0.2373 | 0.2258 | 0.2860 | 0.3093 | 0.2530 | 0.2139 |
| 0.940 | 0.2043 | 0.2525 | 0.2364 | 0.2617 | 0.2963 | 0.2882 | 0.2486 | 0.1695 |
| 0.990 | 0.1501 | 0.2451 | 0.2212 | 0.2288 | 0.1974 | 0.1334 | 0.1787 | 0.0695 |
| 1.000 | 0.0853 | 0.1238 | 0.1521 | | 0.0110 | 0.0788 | 0.0793 | 0.0995 |

TABLE 8.7 (contd) M100 WING PRESSURE DISTRIBUTIONS

MACH=0.501 ALPHA=1.828 CL=0.417 UPPER SURFACE CP VALUES. TRANSITION 2.

| X/C \ ETA= | 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.6553 | 0.4323 | 0.2505 | 0.4867 | 0.6217 | 0.6183 | 0.6406 | 0.6154 |
| 0.010 | -0.0212 | -0.5981 | -0.9303 | -0.9341 | -0.8903 | -0.7378 | -0.7217 | -0.8752 |
| 0.025 | -0.2733 | -0.8738 | -1.0521 | -1.0000 | -0.9391 | -0.7827 | -0.7084 | -0.4557 |
| 0.050 | -0.6553 | -1.0777 | -1.1154 | -1.1854 | -1.0289 | -0.9573 | -0.7745 | -0.7299 |
| 0.075 | -0.7436 | -0.9949 | -1.0585 | -1.0797 | -0.9174 | -0.8304 | -0.7538 | -0.6321 |
| 0.100 | -0.7211 | -0.9785 | -0.9983 | -1.0324 | -0.8119 | -0.7426 | -0.6858 | -0.5620 |
| 0.150 | -0.7529 | -0.8552 | -0.8504 | -0.8257 | -0.6477 | -0.6072 | -0.5559 | -0.4798 |
| 0.200 | -0.7494 | -0.7685 | -0.7505 | -0.7232 | -0.5720 | -0.5484 | -0.5008 | -0.4307 |
| 0.250 | -0.6685 | -0.6841 | -0.6682 | -0.6177 | -0.5252 | -0.5173 | -0.4722 | -0.4031 |
| 0.300 | -0.5743 | -0.6108 | -0.6099 | -0.5404 | -0.4939 | -0.4782 | -0.4419 | -0.3826 |
| 0.350 | -0.4979 | -0.5431 | -0.5342 | -0.4870 | -0.4652 | -0.4608 | -0.4312 | -0.3659 |
| 0.400 | -0.4439 | -0.4780 | -0.4754 | -0.4471 | -0.4490 | -0.4487 | -0.4145 | -0.3587 |
| 0.450 | -0.3918 | -0.4156 | -0.4156 | -0.4126 | -0.4261 | -0.4418 | -0.3954 | -0.3529 |
| 0.500 | -0.3455 | -0.3587 | -0.3671 | -0.3836 | -0.4183 | -0.4281 | -0.3887 | -0.3406 |
| 0.550 | -0.3092 | -0.3119 | -0.3278 | -0.3602 | -0.4097 | -0.4244 | -0.3486 | -0.3410 |
| 0.600 | -0.2719 | -0.2618 | -0.2924 | -0.3374 | -0.3387 | -0.4062 | -0.3603 | -0.3264 |
| 0.650 | -0.2368 | -0.2228 | -0.2582 | -0.3233 | -0.3654 | -0.3857 | -0.3308 | -0.2944 |
| 0.700 | -0.2013 | -0.1901 | -0.2342 | -0.3079 | -0.3659 | -0.3593 | -0.3143 | -0.2627 |
| 0.750 | -0.1651 | -0.1601 | -0.2117 | -0.2851 | -0.3303 | -0.3271 | -0.2793 | -0.2250 |
| 0.800 | -0.1317 | -0.1313 | -0.1843 | -0.2473 | -0.2902 | -0.2823 | -0.2365 | -0.1742 |
| 0.850 | -0.1032 | -0.0976 | -0.1440 | -0.1990 | -0.2324 | -0.2324 | -0.1708 | -0.1103 |
| 0.300 | -0.0757 | -0.0535 | -0.0773 | -0.1267 | -0.1535 | -0.1501 | -0.1140 | -0.0443 |
| 0.950 | -0.0344 | 0.0092 | 0.0029 | -0.0255 | -0.0580 | -0.0506 | -0.0202 | 0.0341 |
| 0.990 | 0.0122 | 0.0699 | 0.0630 | 0.0600 | 0.0145 | 0.0195 | 0.0154 | 0.0605 |
| 1.000 | 0.0373 | 0.0844 | 0.0960 | | 0.0295 | 0.0372 | 0.0492 | 0.0744 |

MACH=0.501 ALPHA=1.828 CL=0.417 LOWER SURFACE CP VALUES. TRANSITION 2.

| X/C \ ETA= | 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.6553 | 0.4323 | 0.2505 | 0.4867 | 0.6217 | 0.6183 | 0.6406 | 0.6154 |
| 0.010 | 0.3146 | 0.3010 | 0.3813 | 0.4721 | | 0.3489 | 0.3439 | 0.2791 |
| 0.025 | 0.1847 | 0.2305 | 0.3059 | 0.3941 | 0.3818 | 0.3157 | 0.3257 | 0.2461 |
| 0.050 | 0.0846 | 0.0940 | 0.1711 | 0.2321 | 0.2195 | 0.1474 | 0.1672 | |
| 0.075 | 0.0558 | 0.0398 | 0.0874 | 0.1658 | 0.1544 | 0.1089 | 0.1034 | 0.0442 |
| 0.100 | 0.0304 | -0.0052 | 0.0815 | 0.1081 | 0.1266 | 0.0757 | 0.0454 | -0.0261 |
| 0.160 | -0.0223 | -0.0804 | -0.0068 | 0.0288 | 0.0475 | 0.0129 | -0.0251 | -0.0805 |
| 0.220 | -0.0605 | -0.0930 | -0.0618 | | -0.0364 | -0.0451 | -0.0646 | -0.1252 |
| 0.280 | -0.0917 | -0.1162 | -0.0953 | -0.0810 | -0.0496 | | -0.1192 | -0.1701 |
| 0.340 | -0.1027 | -0.1236 | -0.1246 | -0.1120 | -0.0899 | -0.1063 | -0.1477 | -0.1772 |
| 0.400 | -0.0367 | -0.1188 | -0.1342 | -0.1222 | -0.1154 | -0.1197 | -0.1537 | -0.1876 |
| 0.460 | -0.0919 | -0.0992 | -0.0992 | -0.1175 | -0.1012 | -0.0965 | -0.1239 | -0.1683 |
| 0.520 | -0.0820 | -0.0793 | -0.0756 | -0.0792 | -0.0614 | -0.0517 | -0.0633 | -0.1150 |
| 0.580 | -0.0532 | -0.0471 | -0.0565 | -0.0519 | -0.0068 | 0.0119 | -0.0053 | -0.0473 |
| 0.640 | -0.0149 | -0.0170 | -0.0181 | -0.0052 | | 0.0757 | 0.0604 | 0.0248 |
| 0.700 | 0.0217 | 0.0283 | -0.0039 | 0.0328 | 0.1075 | 0.1416 | 0.1168 | 0.0797 |
| 0.760 | 0.0665 | 0.0746 | 0.0631 | 0.0768 | 0.1581 | 0.2007 | 0.1672 | 0.1288 |
| 0.820 | 0.0967 | 0.1193 | 0.1183 | 0.1211 | 0.2087 | 0.2358 | 0.1920 | 0.1714 |
| 0.880 | 0.1349 | 0.1827 | 0.1858 | 0.1775 | 0.2439 | 0.2600 | 0.2118 | 0.1902 |
| 0.940 | 0.1556 | 0.1957 | 0.2392 | 0.2168 | 0.2538 | 0.2368 | 0.2067 | 0.1685 |
| 0.990 | 0.1097 | 0.1855 | 0.1691 | 0.1930 | 0.1710 | 0.0883 | 0.1338 | 0.0457 |
| 1.000 | 0.0373 | 0.0844 | 0.0960 | | 0.0295 | 0.0372 | 0.0492 | 0.0744 |

MACH=0.600 ALPHA=1.733 CL=0.420 UPPER SURFACE CP VALUES. TRANSITION 2.

| X/C \ ETA= | 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.6772 | 0.4661 | 0.2854 | 0.5629 | 0.6588 | 0.6518 | 0.6792 | 0.6463 |
| 0.010 | 0.0439 | -0.5063 | -0.8600 | -0.8425 | -0.8379 | -0.6828 | -0.6677 | -0.8644 |
| 0.025 | -0.2107 | -0.8113 | -0.9388 | -0.9765 | -0.9000 | -0.7299 | -0.6300 | -0.3996 |
| 0.050 | -0.6146 | -1.0809 | -1.1396 | -1.2386 | -1.0678 | -0.9028 | -0.7898 | -0.7366 |
| 0.075 | -0.7269 | -1.0153 | -1.0837 | -1.1603 | -0.9618 | -0.8690 | -0.7868 | -0.6538 |
| 0.100 | -0.7138 | -1.0032 | -1.0244 | -1.1269 | -0.8556 | -0.7792 | -0.7158 | -0.5818 |
| 0.150 | -0.7711 | -0.8975 | -0.8904 | -0.8771 | -0.6707 | -0.6333 | -0.5758 | -0.4974 |
| 0.200 | -0.7794 | -0.8069 | -0.7994 | -0.7544 | -0.6017 | -0.5619 | -0.5189 | -0.4482 |
| 0.250 | -0.7004 | -0.7176 | -0.7098 | -0.6401 | -0.5528 | -0.5326 | -0.4808 | -0.4226 |
| 0.300 | -0.6023 | -0.6371 | -0.6379 | -0.5633 | -0.5106 | -0.4965 | -0.4627 | -0.4029 |
| 0.350 | -0.5209 | -0.5879 | -0.5532 | -0.5069 | -0.4862 | -0.4768 | -0.4418 | -0.3843 |
| 0.400 | -0.4639 | -0.4964 | -0.4654 | -0.4627 | -0.4651 | -0.4636 | -0.4327 | -0.3746 |
| 0.450 | -0.4122 | -0.4313 | -0.4292 | -0.4269 | -0.4466 | -0.4577 | -0.3982 | -0.3660 |
| 0.500 | -0.3639 | -0.3691 | -0.3810 | -0.3987 | -0.4315 | -0.4506 | -0.4073 | -0.3609 |
| 0.550 | -0.3256 | -0.3227 | -0.3341 | -0.3732 | -0.4261 | -0.4397 | -0.3896 | -0.3557 |
| 0.600 | -0.2868 | -0.2707 | -0.2998 | -0.3520 | -0.4123 | -0.4222 | -0.3761 | -0.3377 |
| 0.650 | -0.2499 | -0.2321 | -0.2675 | -0.3367 | -0.3999 | -0.4029 | -0.3547 | -0.3045 |
| 0.700 | -0.2103 | -0.1966 | -0.2433 | -0.3235 | -0.3798 | -0.3735 | -0.3259 | -0.2710 |
| 0.750 | -0.1730 | -0.1674 | -0.2220 | -0.3052 | -0.3428 | -0.3406 | -0.2888 | -0.2311 |
| 0.800 | -0.1368 | -0.1373 | -0.1917 | -0.2647 | -0.2976 | -0.2884 | -0.2434 | -0.1763 |
| 0.850 | -0.1062 | -0.1009 | -0.1475 | -0.2106 | -0.2330 | -0.2346 | -0.1705 | -0.1002 |
| 0.900 | -0.0771 | -0.0514 | -0.0780 | -0.1273 | -0.1459 | -0.1461 | -0.1096 | -0.0372 |
| 0.950 | -0.0340 | 0.0120 | 0.0059 | -0.0223 | -0.0507 | -0.0457 | -0.0135 | 0.0403 |
| 0.990 | 0.0152 | 0.0753 | 0.0658 | 0.0634 | 0.0166 | 0.0133 | 0.0214 | 0.0669 |
| 1.000 | 0.0391 | 0.0904 | 0.1003 | | 0.0304 | 0.0345 | 0.0508 | 0.0812 |

MACH=0.600 ALPHA=1.733 CL=0.420 LOWER SURFACE CP VALUES. TRANSITION 2.

| X/C \ ETA= | 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.6772 | 0.4661 | 0.2854 | 0.5629 | 0.6588 | 0.6518 | 0.6792 | 0.6463 |
| 0.010 | 0.3068 | 0.2843 | 0.3593 | 0.4508 | | 0.3281 | 0.3279 | 0.2655 |
| 0.025 | 0.1663 | 0.2051 | 0.2805 | 0.3747 | 0.3601 | 0.2897 | 0.3108 | 0.2362 |
| 0.050 | 0.0836 | 0.0767 | 0.1490 | 0.2129 | 0.2093 | 0.1312 | 0.1516 | |
| 0.075 | 0.0511 | 0.0229 | 0.0624 | 0.1417 | 0.1375 | 0.0977 | 0.0926 | 0.0301 |
| 0.100 | 0.0219 | -0.0227 | 0.0428 | 0.0903 | 0.0965 | 0.0601 | 0.0266 | -0.0402 |
| 0.160 | -0.0331 | -0.0992 | -0.0217 | 0.0136 | 0.0264 | -0.0055 | -0.0384 | -0.0929 |
| 0.220 | -0.0671 | -0.1100 | -0.0794 | | -0.0339 | -0.0834 | -0.0827 | -0.1425 |
| 0.280 | -0.1025 | -0.1345 | -0.1126 | -0.0971 | -0.0609 | | -0.1416 | -0.1915 |
| 0.340 | -0.1139 | -0.1404 | -0.1374 | -0.1310 | -0.1193 | -0.1239 | -0.1664 | -0.1931 |
| 0.400 | -0.1080 | -0.1329 | -0.1474 | -0.1396 | -0.1408 | -0.1371 | -0.1749 | -0.2042 |
| 0.460 | -0.1014 | -0.1138 | -0.1136 | -0.1351 | -0.1181 | -0.1097 | -0.1418 | -0.1828 |
| 0.520 | -0.0834 | -0.0919 | -0.0895 | -0.0952 | -0.0779 | -0.0622 | -0.0737 | -0.1248 |
| 0.530 | -0.0607 | -0.0571 | -0.0665 | -0.0597 | -0.0192 | 0.0055 | -0.0120 | -0.0523 |
| 0.640 | -0.0223 | -0.0246 | -0.0285 | -0.0137 | | 0.0731 | 0.0565 | 0.0226 |
| 0.700 | 0.0166 | 0.0260 | -0.0111 | 0.0294 | 0.1038 | 0.1410 | 0.1144 | 0.0799 |
| 0.760 | 0.0626 | 0.0723 | 0.0598 | 0.0772 | 0.1560 | 0.2021 | 0.1668 | 0.1320 |
| 0.820 | 0.0955 | 0.1218 | 0.1169 | 0.1204 | 0.2119 | 0.2377 | 0.1944 | 0.1738 |
| 0.880 | 0.1370 | 0.1884 | 0.1881 | 0.1807 | 0.2471 | 0.2623 | 0.2161 | 0.1950 |
| 0.940 | 0.1577 | 0.1998 | 0.2457 | 0.2211 | 0.2577 | 0.2391 | 0.2111 | 0.1728 |
| 0.330 | 0.1127 | 0.1912 | 0.1740 | 0.1343 | 0.1708 | 0.0872 | 0.1361 | 0.0506 |
| 1.000 | 0.0391 | 0.0904 | 0.1003 | | 0.0304 | 0.0345 | 0.0508 | 0.0812 |

TABLE 8.7 (contd) M100 WING PRESSURE DISTRIBUTIONS

MACH=0.702 ALPHA=1.378 CL=0.407 UPPER SURFACE CP VALUES. TRANSITION 2.

| X/C \ ETA= | 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.7118 | 0.5169 | 0.3473 | 0.6524 | 0.7141 | 0.7035 | 0.7138 | 0.6960 |
| 0.010 | 0.1602 | -0.3411 | -0.6695 | -0.8188 | -0.6386 | -0.4762 | -0.4976 | -0.7416 |
| 0.025 | -0.0900 | -0.6032 | -0.8252 | -0.7398 | -0.7318 | -0.5594 | -0.4788 | -0.6631 |
| 0.050 | -0.5010 | -1.0080 | -1.0655 | -1.1720 | -1.0714 | -0.9472 | -0.7328 | -0.7107 |
| 0.075 | -0.6457 | -0.9384 | -1.2719 | -1.2968 | -1.1222 | -0.8541 | -0.7915 | -0.6370 |
| 0.100 | -0.6595 | -1.0998 | -1.0547 | -1.3751 | -0.9085 | -0.8105 | -0.7290 | -0.5915 |
| 0.150 | -0.7776 | -0.9626 | -0.9607 | -0.9409 | -0.7067 | -0.6475 | -0.5931 | -0.5154 |
| 0.200 | -0.8335 | -0.8623 | -0.8792 | -0.7819 | -0.8125 | -0.5648 | -0.5317 | -0.4664 |
| 0.250 | -0.7531 | -0.7633 | -0.7663 | -0.6547 | -0.5675 | -0.5535 | -0.5023 | -0.4378 |
| 0.300 | -0.6391 | -0.6709 | -0.6737 | -0.5700 | -0.5372 | -0.5155 | -0.4785 | -0.4236 |
| 0.350 | -0.5517 | -0.6029 | -0.5792 | -0.5118 | -0.5099 | -0.4994 | -0.4581 | -0.4048 |
| 0.400 | -0.4940 | -0.5265 | -0.5076 | -0.4730 | -0.4879 | -0.4320 | -0.4514 | -0.3955 |
| 0.450 | -0.4344 | -0.4539 | -0.4421 | -0.4351 | -0.4679 | -0.4840 | -0.4130 | -0.3879 |
| 0.500 | -0.3814 | -0.3806 | -0.3882 | -0.4045 | -0.4540 | -0.4737 | -0.4220 | -0.3008 |
| 0.550 | -0.3436 | -0.3351 | -0.3434 | -0.3863 | -0.4489 | -0.4879 | -0.4083 | -0.3733 |
| 0.600 | -0.3024 | -0.2809 | -0.3063 | -0.3658 | -0.4353 | -0.4486 | -0.3933 | -0.3538 |
| 0.650 | -0.2633 | -0.2395 | -0.2723 | -0.3499 | -0.4201 | -0.4228 | -0.3706 | -0.3165 |
| 0.700 | -0.2233 | -0.2040 | -0.2507 | -0.3360 | -0.3352 | -0.3901 | -0.3410 | -0.2770 |
| 0.750 | -0.1827 | -0.1734 | -0.2281 | -0.3162 | -0.3503 | -0.3499 | -0.2988 | -0.2326 |
| 0.800 | -0.1445 | -0.1398 | -0.1967 | -0.2729 | -0.2363 | -0.2906 | -0.2487 | -0.1708 |
| 0.850 | -0.1098 | -0.1020 | -0.1498 | -0.2091 | -0.2241 | -0.2290 | -0.1657 | -0.0908 |
| 0.900 | -0.0794 | -0.0434 | -0.0725 | -0.1212 | -0.1318 | -0.1914 | -0.1013 | -0.0257 |
| 0.950 | -0.0332 | 0.0205 | 0.0185 | -0.0110 | -0.0378 | -0.0309 | -0.0044 | 0.0538 |
| 0.990 | 0.0190 | 0.0855 | 0.0703 | 0.0689 | 0.0196 | 0.0230 | 0.0202 | 0.0794 |
| 1.000 | 0.0470 | 0.1003 | 0.1112 | | 0.0282 | 0.0320 | 0.0554 | 0.0923 |

MACH=0.702 ALPHA=1.378 CL=0.407 LOWER SURFACE CP VALUES. TRANSITION 2.

| X/C \ ETA= | 0.018 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.7118 | 0.5169 | 0.3473 | 0.6524 | 0.7141 | 0.7035 | 0.7138 | 0.6960 |
| 0.100 | 0.2328 | 0.2409 | 0.3052 | 0.3881 | | 0.2635 | 0.2582 | 0.1980 |
| 0.025 | 0.1492 | 0.1617 | 0.2222 | 0.3141 | 0.3015 | 0.2264 | 0.2410 | 0.1871 |
| 0.050 | 0.0569 | 0.0277 | 0.0970 | 0.1615 | 0.1588 | 0.0727 | 0.1024 | |
| 0.075 | 0.0269 | -0.0138 | 0.0062 | 0.0954 | 0.0867 | 0.0485 | 0.0462 | -0.0129 |
| 0.100 | 0.0047 | -0.0546 | -0.0002 | 0.0440 | 0.0515 | 0.0124 | -0.0172 | -0.0814 |
| 0.160 | -0.0527 | -0.1410 | -0.0628 | -0.0302 | -0.0258 | -0.0453 | -0.0802 | -0.1371 |
| 0.220 | -0.0924 | -0.1466 | -0.1232 | | -0.0719 | -0.1024 | -0.1273 | -0.1871 |
| 0.280 | -0.1290 | -0.1703 | -0.1546 | -0.1407 | -0.1202 | | -0.1870 | -0.2342 |
| 0.340 | -0.1424 | -0.1762 | -0.1784 | -0.1709 | -0.1619 | -0.1876 | -0.2144 | -0.2354 |
| 0.400 | -0.1355 | -0.1666 | -0.1831 | -0.1820 | -0.1762 | -0.1740 | -0.2161 | -0.2422 |
| 0.460 | -0.1262 | -0.1405 | -0.1464 | -0.1714 | -0.1505 | -0.1431 | -0.1754 | -0.2131 |
| 0.520 | -0.1111 | -0.1161 | -0.1170 | -0.1250 | -0.1029 | -0.0819 | -0.0993 | -0.1446 |
| 0.580 | -0.0783 | -0.0757 | -0.0864 | -0.0858 | -0.0369 | -0.0078 | -0.0254 | -0.0640 |
| 0.640 | -0.0359 | -0.0371 | -0.0424 | -0.0304 | | 0.0678 | 0.0526 | 0.0188 |
| 0.700 | 0.0103 | 0.0166 | -0.0188 | 0.0210 | 0.1004 | 0.1387 | 0.1142 | 0.0820 |
| 0.760 | 0.0601 | 0.0709 | 0.0559 | 0.0730 | 0.1586 | 0.2001 | 0.1680 | 0.1349 |
| 0.820 | 0.0972 | 0.1256 | 0.1218 | 0.1253 | 0.2134 | 0.2382 | 0.1970 | 0.1709 |
| 0.880 | 0.1427 | 0.1957 | 0.1978 | 0.1879 | 0.2548 | 0.2624 | 0.2186 | 0.2030 |
| 0.940 | 0.1690 | 0.2146 | 0.2550 | 0.2285 | 0.2668 | 0.2333 | 0.2147 | 0.1817 |
| 0.990 | 0.1212 | 0.2061 | 0.1866 | 0.2010 | 0.1758 | 0.0850 | 0.1402 | 0.0607 |
| 1.000 | 0.0470 | 0.1003 | 0.1112 | | 0.0282 | 0.0320 | 0.0554 | 0.0323 |

MACH=0.821 ALPHA=0.888 CL=0.421 UPPER SURFACE CP VALUES. TRANSITION 1.

| X/C \ ETA= | 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.7630 | 0.5735 | 0.4330 | 0.7150 | 0.7405 | 0.7540 | 0.7472 | 0.7457 |
| 0.010 | 0.3168 | -0.0973 | -0.3269 | -0.2446 | -0.3051 | -0.2251 | -0.2671 | -0.4582 |
| 0.025 | 0.0876 | -0.3408 | -0.4867 | -0.3652 | -0.3957 | -0.2914 | -0.2491 | -0.0977 |
| 0.050 | -0.3140 | -0.7258 | -0.7960 | -0.6547 | -0.7783 | -0.8385 | -0.6081 | -0.6834 |
| 0.075 | -0.4637 | -0.7763 | -0.9234 | -0.8994 | -0.8788 | -0.8828 | -0.8181 | -0.6910 |
| 0.100 | -0.4877 | -0.8931 | -0.9834 | -1.0151 | -0.9321 | -0.9202 | -0.8812 | -0.6397 |
| 0.150 | -0.6365 | -0.9229 | -1.0535 | -1.1188 | -1.0052 | -0.9148 | -0.7792 | -0.5305 |
| 0.200 | -0.7277 | -0.9490 | -1.0680 | -1.1734 | -0.3754 | -0.8937 | -0.5976 | -0.5528 |
| 0.250 | -0.7636 | -0.9855 | -1.0396 | -1.1791 | -0.9646 | -0.7964 | -0.5715 | -0.5077 |
| 0.300 | -0.7939 | -0.9843 | -1.0290 | -1.1388 | -0.9349 | -0.5406 | -0.6518 | -0.5052 |
| 0.350 | -0.7689 | -0.8904 | -1.0288 | -1.0712 | -0.8681 | -0.3773 | -0.5797 | -0.4914 |
| 0.400 | -0.6710 | -0.8013 | -1.0358 | -1.0426 | -0.2312 | -0.4813 | -0.4626 | -0.4660 |
| 0.450 | -0.6495 | -0.6594 | -0.6015 | -0.4055 | -0.2583 | -0.5368 | -0.4572 | -0.4420 |
| 0.500 | -0.5471 | -0.4341 | -0.3223 | -0.2231 | -0.3075 | -0.5832 | -0.4791 | -0.4256 |
| 0.550 | -0.4276 | -0.3305 | -0.2502 | -0.2247 | -0.4033 | -0.6093 | -0.4697 | -0.4128 |
| 0.600 | -0.3542 | -0.2714 | -0.2224 | -0.2378 | -0.4389 | -0.5730 | -0.4477 | -0.3821 |
| 0.650 | -0.2921 | -0.2282 | -0.2170 | -0.2632 | -0.4543 | -0.5092 | -0.4230 | -0.3311 |
| 0.700 | -0.2353 | -0.1918 | -0.2153 | -0.2900 | -0.4445 | -0.4380 | -0.3747 | -0.2791 |
| 0.750 | -0.1862 | -0.1620 | -0.2081 | -0.2924 | -0.3849 | -0.3744 | -0.3172 | -0.2241 |
| 0.800 | -0.1416 | -0.1305 | -0.1859 | -0.2656 | -0.3184 | -0.2995 | -0.2518 | -0.1523 |
| 0.850 | -0.1044 | -0.0914 | -0.1418 | -0.2089 | -0.2376 | -0.2202 | -0.1506 | -0.0732 |
| 0.900 | -0.0706 | -0.0347 | -0.0560 | -0.1190 | -0.1318 | -0.1057 | -0.0762 | 0.0031 |
| 0.950 | -0.0231 | 0.0431 | 0.0469 | 0.0111 | -0.0187 | -0.0033 | 0.0210 | 0.0818 |
| 0.990 | 0.0344 | 0.1143 | 0.1169 | 0.1192 | 0.0524 | 0.0480 | 0.0507 | 0.1050 |
| 1.000 | 0.0629 | 0.1238 | 0.1597 | | 0.0718 | 0.0523 | 0.0737 | 0.1165 |

MACH=0.821 ALPHA=0.888 CL=0.421 LOWER SURFACE CP VALUES. TRANSITION 1.

| X/C \ ETA= | 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.7630 | 0.5735 | 0.4330 | 0.7150 | 0.7405 | 0.7540 | 0.7472 | 0.7457 |
| 0.010 | 0.2758 | 0.1455 | 0.1976 | 0.2707 | | 0.1662 | 0.1754 | 0.1469 |
| 0.025 | 0.1224 | 0.0834 | 0.1133 | 0.1950 | 0.1771 | 0.1271 | 0.1580 | 0.1203 |
| 0.050 | 0.0389 | -0.0357 | 0.0109 | 0.0496 | 0.0429 | -0.0177 | 0.0368 | |
| 0.075 | 0.0099 | -0.0658 | -0.0990 | 0.0149 | 0.0186 | -0.0341 | -0.0174 | -0.0874 |
| 0.100 | -0.0158 | -0.1138 | -0.0706 | -0.0467 | -0.0204 | -0.0632 | -0.0731 | -0.1339 |
| 0.160 | -0.0763 | -0.1936 | -0.1357 | -0.1050 | -0.0084 | -0.1077 | -0.1425 | -0.1980 |
| 0.220 | -0.1264 | -0.2048 | -0.1957 | | -0.1557 | -0.1681 | -0.1784 | -0.2558 |
| 0.280 | -0.1675 | -0.2325 | -0.2343 | -0.2237 | -0.1994 | | -0.2579 | -0.3094 |
| 0.340 | -0.1876 | -0.2407 | -0.2604 | -0.2558 | -0.2343 | -0.2269 | -0.2898 | -0.3141 |
| 0.400 | -0.1844 | -0.2278 | -0.2585 | -0.2609 | -0.2545 | -0.2241 | -0.2777 | -0.3131 |
| 0.460 | -0.1788 | -0.1950 | -0.2082 | -0.2373 | -0.2049 | -0.1828 | -0.2153 | -0.2553 |
| 0.520 | -0.1573 | -0.1593 | -0.1658 | -0.1697 | -0.1305 | -0.1066 | -0.1203 | -0.1698 |
| 0.580 | -0.1148 | -0.1084 | -0.1195 | -0.1145 | -0.0521 | -0.0131 | -0.0367 | -0.0705 |
| 0.640 | -0.0624 | -0.0557 | -0.0592 | -0.0434 | | 0.0728 | 0.0509 | 0.0243 |
| 0.700 | -0.0027 | 0.0092 | -0.0209 | 0.0197 | 0.1109 | 0.1409 | 0.1208 | 0.0923 |
| 0.760 | 0.0594 | 0.0748 | 0.0627 | 0.0819 | 0.1777 | 0.2103 | 0.1748 | 0.1489 |
| 0.820 | 0.1040 | 0.1381 | 0.1405 | 0.1432 | 0.2358 | 0.2492 | 0.2037 | 0.1324 |
| 0.880 | 0.1575 | 0.2133 | 0.2242 | 0.2112 | 0.2781 | 0.2745 | 0.2266 | 0.2158 |
| 0.940 | 0.1308 | 0.2428 | 0.2046 | 0.2528 | 0.2948 | 0.2591 | 0.2280 | 0.1900 |
| 0.990 | 0.1433 | 0.2400 | 0.2258 | 0.2335 | 0.2161 | 0.1138 | 0.1595 | 0.0932 |
| 1.000 | 0.0629 | 0.1298 | 0.1597 | | 0.0718 | 0.0523 | 0.0737 | 0.1165 |

TABLE 8.7 (contd) M100 WING PRESSURE DISTRIBUTIONS

MACH=0.840 ALPHA=0.787 CL=0.427 UPPER SURFACE CP VALUES. TRANSITION 1.

| X/C \ ETA= | 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.7733 | 0.5769 | 0.4371 | 0.7179 | 0.7369 | 0.7523 | 0.7463 | 0.7422 |
| 0.010 | 0.3467 | -0.0470 | -0.2728 | -0.1871 | -0.2304 | -0.1734 | -0.2224 | -0.4012 |
| 0.025 | 0.1059 | -0.3025 | -0.4340 | -0.3141 | -0.3087 | -0.2428 | -0.2273 | -0.0679 |
| 0.050 | -0.2862 | -0.6946 | -0.7324 | -0.7067 | -0.7169 | -0.7652 | -0.5795 | -0.6803 |
| 0.075 | -0.4165 | -0.7224 | -0.8558 | -0.8204 | -0.8178 | -0.8143 | -0.7750 | -0.7374 |
| 0.100 | -0.4370 | -0.8272 | -0.9169 | -0.9457 | -0.9267 | -0.8663 | -0.8288 | -0.7092 |
| 0.150 | -0.6040 | -0.8781 | -0.9961 | -1.0501 | -0.9320 | -0.8772 | -0.8459 | -0.5737 |
| 0.200 | -0.6991 | -0.9078 | -1.0102 | -1.1188 | -0.9288 | -0.8871 | -0.8111 | -0.5853 |
| 0.250 | -0.7698 | -0.9536 | -1.0039 | -1.1332 | -0.9313 | -0.8589 | -0.7644 | -0.4257 |
| 0.300 | -0.7609 | -0.9540 | -0.9907 | -1.1077 | -0.9192 | -0.8471 | -0.7263 | -0.4702 |
| 0.350 | -0.7607 | -0.8869 | -0.9833 | -1.0694 | -0.9142 | -0.7647 | -0.5257 | -0.4865 |
| 0.400 | -0.6713 | -0.8275 | -1.0037 | -1.0333 | -0.8990 | -0.5703 | -0.4391 | -0.5178 |
| 0.450 | -0.6566 | -0.7469 | -1.0100 | -0.9789 | -0.7646 | -0.3603 | -0.5043 | -0.5581 |
| 0.500 | -0.6187 | -0.6590 | -0.8627 | -0.5594 | -0.3741 | -0.3606 | -0.5652 | -0.4681 |
| 0.550 | -0.5532 | -0.3892 | -0.3340 | -0.2802 | -0.3085 | -0.4640 | -0.4653 | -0.3740 |
| 0.600 | -0.4403 | -0.2058 | -0.2178 | -0.2186 | -0.3428 | -0.5511 | -0.4492 | -0.3686 |
| 0.650 | -0.3119 | -0.2268 | -0.1782 | -0.2162 | -0.3753 | -0.5409 | -0.4267 | -0.3218 |
| 0.700 | -0.2409 | -0.1827 | -0.1728 | -0.2417 | -0.3910 | -0.4485 | -0.3870 | -0.2715 |
| 0.750 | -0.1880 | -0.1510 | -0.1708 | -0.2530 | -0.3634 | -0.3934 | -0.3293 | -0.2170 |
| 0.800 | -0.1408 | -0.1206 | -0.1615 | -0.2311 | -0.3044 | -0.3024 | -0.2574 | -0.1460 |
| 0.850 | -0.1000 | -0.0811 | -0.1232 | -0.1857 | -0.2262 | -0.2272 | -0.1530 | -0.0653 |
| 0.900 | -0.0656 | -0.0234 | -0.0392 | -0.0703 | -0.1245 | -0.1102 | -0.0786 | 0.0112 |
| 0.950 | -0.0172 | 0.0520 | 0.0570 | 0.0225 | -0.0133 | 0.0053 | 0.0243 | 0.0664 |
| 0.990 | 0.0384 | 0.1211 | 0.1231 | 0.1282 | 0.0852 | 0.0641 | 0.0600 | 0.1100 |
| 1.000 | 0.0662 | 0.1344 | 0.1652 | | 0.0779 | 0.0734 | 0.0758 | 0.1201 |

MACH=0.840 ALPHA=0.787 CL=0.427 LOWER SURFACE CP VALUES. TRANSITION 1.

| X/C \ ETA= | 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.7733 | 0.5769 | 0.4371 | 0.7179 | 0.7369 | 0.7523 | 0.7463 | 0.7422 |
| 0.010 | 0.2687 | 0.1438 | 0.1715 | 0.2292 | | 0.1187 | 0.1557 | 0.1500 |
| 0.025 | 0.1176 | 0.0711 | 0.0923 | 0.1587 | 0.1370 | 0.0915 | 0.1295 | 0.1182 |
| 0.050 | 0.0304 | -0.0533 | -0.0088 | 0.0341 | 0.0164 | -0.0289 | 0.0109 | |
| 0.075 | 0.0022 | -0.0807 | -0.1194 | -0.0041 | -0.0095 | -0.0522 | -0.0300 | -0.0812 |
| 0.100 | -0.0214 | -0.1191 | -0.0960 | -0.0898 | -0.0460 | -0.0855 | -0.0759 | -0.1439 |
| 0.160 | -0.0818 | [illegible] | -0.1569 | -0.1263 | -0.1073 | -0.1293 | -0.1490 | -0.1930 |
| 0.220 | -0.1383 | -0.2249 | -0.2176 | | -0.1787 | -0.1662 | -0.1938 | -0.2587 |
| 0.280 | -0.1600 | -0.2531 | -0.2622 | -0.2337 | -0.2165 | | -0.2654 | -0.3192 |
| 0.340 | -0.2006 | -0.2587 | -0.2789 | -0.2791 | -0.2534 | -0.2343 | -0.2916 | -0.3228 |
| 0.400 | -0.1974 | -0.2378 | -0.2764 | -0.2824 | -0.2688 | -0.2321 | -0.2819 | -0.3211 |
| 0.460 | -0.1898 | -0.2093 | -0.2164 | -0.2549 | -0.2168 | -0.1841 | -0.2105 | -0.2705 |
| 0.520 | -0.1681 | -0.1714 | -0.1715 | -0.1823 | -0.1418 | -0.1058 | -0.1196 | -0.1707 |
| 0.580 | -0.1211 | -0.1152 | -0.1265 | -0.1173 | -0.0548 | -0.0115 | -0.0305 | -0.0694 |
| 0.640 | -0.0651 | -0.0606 | -0.0658 | -0.0445 | | 0.0757 | 0.0560 | 0.0250 |
| 0.700 | -0.0063 | 0.0097 | -0.0213 | 0.0201 | 0.1125 | 0.1530 | 0.1228 | 0.0930 |
| 0.760 | 0.0656 | 0.0758 | 0.0654 | 0.0841 | 0.1768 | 0.2117 | 0.1700 | 0.1484 |
| 0.820 | 0.1038 | 0.1399 | 0.1441 | 0.1457 | 0.2352 | 0.2486 | 0.2068 | 0.1903 |
| 0.880 | 0.1603 | 0.2170 | 0.2251 | 0.2111 | 0.2797 | 0.2754 | 0.2280 | 0.2158 |
| 0.940 | 0.1944 | 0.2459 | 0.2067 | 0.2518 | 0.2939 | 0.2611 | 0.2263 | 0.1987 |
| 0.990 | 0.1450 | 0.2424 | 0.2321 | 0.2318 | 0.2141 | 0.1215 | 0.1636 | 0.0981 |
| 1.000 | 0.0662 | 0.1344 | 0.1652 | | 0.0779 | 0.0734 | 0.0758 | 0.1201 |

MACH=0.860 ALPHA=0.539 CL=0.415 UPPER SURFACE CP VALUES. TRANSITION 1.

| X/C \ ETA= | 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.7829 | 0.5863 | 0.4459 | 0.7235 | 0.7305 | 0.7575 | 0.7448 | 0.7507 |
| 0.010 | 0.3851 | 0.0163 | -0.2085 | -0.1008 | -0.1394 | -0.0940 | -0.1460 | -0.3203 |
| 0.025 | 0.1574 | -0.2254 | -0.3465 | -0.2236 | -0.2212 | -0.1715 | -0.1280 | -0.0021 |
| 0.050 | -0.2360 | -0.6004 | -0.6505 | -0.6001 | -0.6239 | -0.6685 | -0.5017 | -0.5999 |
| 0.075 | -0.3741 | -0.6487 | -0.7795 | -0.7279 | -0.7232 | -0.7178 | -0.7016 | -0.6551 |
| 0.100 | -0.4002 | -0.7788 | -0.8513 | -0.8649 | -0.8418 | -0.7879 | -0.7669 | -0.6666 |
| 0.150 | -0.5555 | -0.8016 | -0.9126 | -0.9764 | -0.8581 | -0.7982 | -0.7876 | -0.6249 |
| 0.200 | -0.6465 | -0.8464 | -0.9280 | -1.0338 | -0.8438 | -0.7968 | -0.7579 | -0.6505 |
| 0.250 | -0.7161 | -0.9033 | -0.9395 | -1.0292 | -0.8463 | -0.7940 | -0.6687 | -0.6173 |
| 0.300 | -0.7230 | -0.9113 | -0.9365 | -1.0255 | -0.8434 | -0.7951 | -0.7352 | -0.6134 |
| 0.350 | -0.7245 | -0.8648 | -0.9307 | -1.0157 | -0.8576 | -0.7576 | -0.7403 | -0.5553 |
| 0.400 | -0.6440 | -0.8196 | -0.9611 | -0.9675 | -0.8323 | -0.7738 | -0.6800 | -0.3791 |
| 0.450 | -0.6476 | -0.7549 | -0.9722 | -0.9344 | -0.8863 | -0.7827 | -0.6405 | -0.4500 |
| 0.500 | -0.6206 | -0.7049 | -0.9292 | -0.9187 | -0.9006 | -0.7704 | -0.5983 | -0.4920 |
| 0.550 | -0.5049 | -0.6544 | -0.7783 | -0.8984 | -0.9039 | -0.7453 | -0.3576 | -0.4475 |
| 0.600 | -0.5756 | -0.5215 | -0.3912 | -0.5208 | -0.4619 | -0.3951 | -0.3668 | -0.3162 |
| 0.650 | -0.5095 | -0.2988 | -0.2314 | -0.2833 | -0.3365 | -0.3819 | -0.3851 | -0.3035 |
| 0.700 | -0.3028 | -0.1960 | -0.1679 | -0.2239 | -0.2937 | -0.4075 | -0.3563 | -0.2576 |
| 0.750 | -0.2059 | -0.1443 | -0.1428 | -0.1961 | -0.2792 | -0.3462 | -0.3046 | -0.2023 |
| 0.800 | -0.1399 | -0.1058 | -0.1217 | -0.1754 | -0.2359 | -0.2655 | -0.2437 | -0.1314 |
| 0.850 | -0.0957 | -0.0655 | -0.0875 | -0.1306 | -0.1693 | -0.2008 | -0.1413 | -0.0542 |
| 0.900 | -0.0581 | -0.0105 | -0.0167 | -0.0538 | -0.0920 | -0.0942 | -0.0604 | 0.0207 |
| 0.950 | -0.0073 | 0.0822 | 0.0742 | 0.0485 | 0.0059 | 0.0128 | 0.0331 | 0.0356 |
| 0.990 | 0.0472 | 0.1267 | 0.1356 | 0.1260 | 0.0673 | 0.0671 | 0.0640 | 0.1177 |
| 1.000 | 0.0723 | 0.1386 | 0.1713 | | 0.0759 | 0.0772 | 0.0891 | 0.1282 |

MACH=0.860 ALPHA=0.539 CL=0.415 LOWER SURFACE CP VALUES. TRANSITION 1.

| X/C \ ETA= | 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.7829 | 0.5863 | 0.4459 | 0.7235 | 0.7305 | 0.7575 | 0.7448 | 0.7507 |
| 0.010 | 0.2575 | 0.0958 | 0.1411 | 0.1635 | | 0.0434 | 0.0936 | 0.0935 |
| 0.025 | 0.1088 | 0.0315 | 0.0457 | 0.1167 | 0.0824 | 0.0251 | 0.0600 | 0.0638 |
| 0.050 | 0.0234 | -0.0792 | -0.0470 | -0.0060 | -0.0378 | -0.0909 | -0.0267 | |
| 0.075 | -0.0063 | -0.0937 | -0.1465 | -0.0342 | -0.0654 | -0.1027 | -0.0681 | -0.1104 |
| 0.100 | -0.0281 | -0.1415 | -0.1283 | -0.1158 | -0.0908 | -0.1334 | -0.1272 | -0.1708 |
| 0.160 | -0.0900 | -0.2318 | -0.1946 | -0.1601 | -0.1465 | -0.1631 | -0.1910 | -0.2352 |
| 0.220 | -0.1470 | -0.2444 | -0.2544 | | -0.2149 | -0.2184 | -0.2325 | -0.3080 |
| 0.280 | -0.1979 | -0.2795 | -0.2903 | -0.2045 | -0.2360 | | -0.3039 | -0.3558 |
| 0.340 | -0.2214 | -0.2873 | -0.3114 | -0.3204 | -0.2863 | -0.2796 | -0.3381 | -0.3576 |
| 0.400 | -0.2219 | -0.2691 | -0.3053 | -0.3153 | -0.3063 | -0.2610 | -0.3147 | -0.3600 |
| 0.460 | -0.2105 | -0.2342 | -0.2446 | -0.2820 | -0.2451 | -0.2038 | -0.2368 | -0.2959 |
| 0.520 | -0.1854 | -0.1901 | -0.1942 | -0.2004 | -0.1588 | -0.1210 | -0.1311 | -0.1767 |
| 0.580 | -0.1357 | -0.1271 | -0.1432 | -0.1330 | -0.0657 | -0.0193 | -0.0381 | -0.0600 |
| 0.640 | -0.0772 | -0.0690 | -0.0756 | -0.0565 | | 0.0735 | 0.0511 | 0.0283 |
| 0.700 | -0.0137 | 0.0016 | -0.0268 | 0.0140 | 0.1068 | 0.1510 | 0.1185 | 0.0967 |
| 0.760 | 0.0515 | 0.0711 | 0.0616 | 0.0811 | 0.1737 | 0.2070 | 0.1748 | 0.1515 |
| 0.820 | 0.1022 | 0.1392 | 0.1437 | 0.1428 | 0.2323 | 0.2448 | 0.2050 | 0.1333 |
| 0.880 | 0.1590 | 0.2172 | 0.2266 | 0.2076 | 0.2750 | 0.2733 | 0.2268 | 0.2170 |
| 0.940 | 0.1358 | 0.2477 | 0.2871 | 0.2444 | 0.2913 | 0.2819 | 0.2290 | 0.2029 |
| 0.990 | 0.1478 | 0.2449 | 0.2369 | 0.2222 | 0.2153 | 0.1287 | 0.1670 | 0.1081 |
| 1.000 | 0.0723 | 0.1385 | 0.1713 | | 0.0759 | 0.0772 | 0.0891 | 0.1282 |

TABLE 8.7 (contd) M100 WING PRESSURE DISTRIBUTIONS

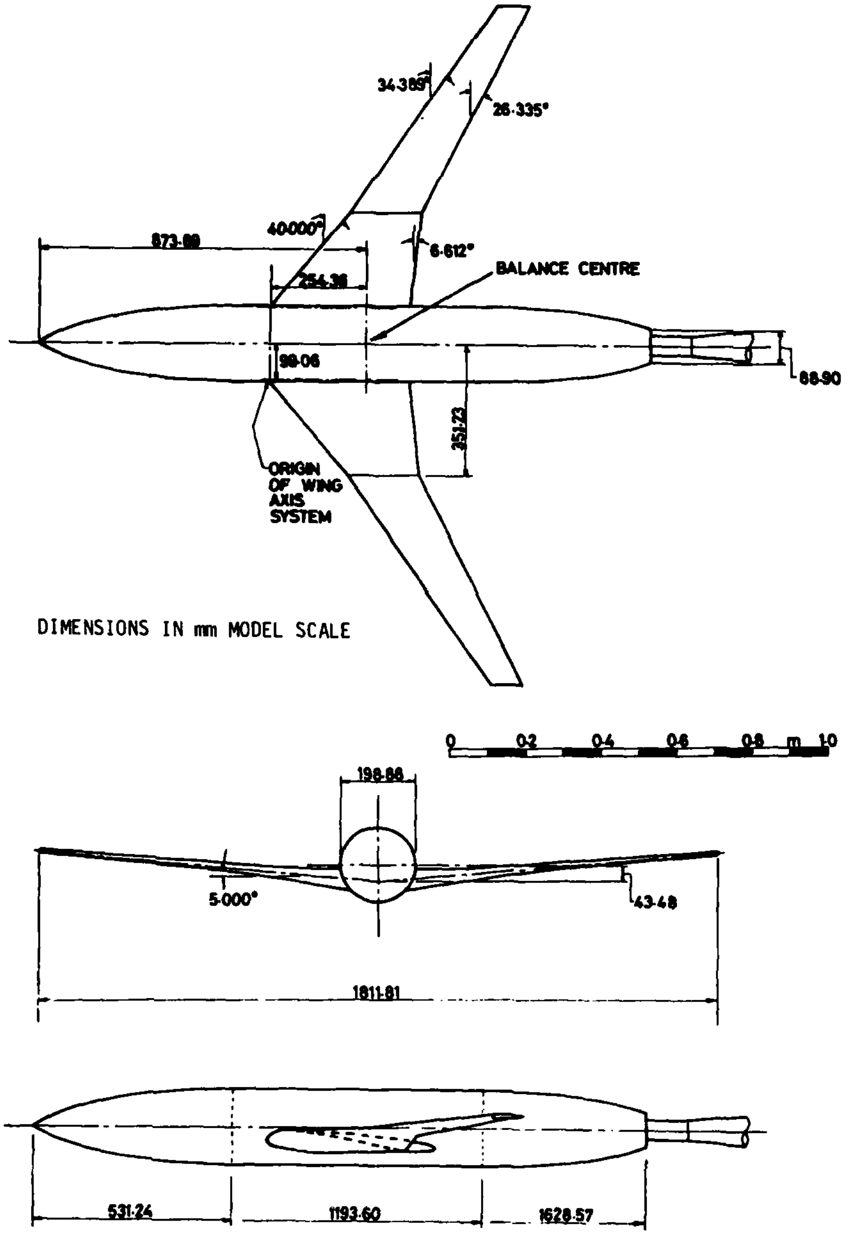
MACH=0.879 ALPHA=0.467 CL=0.405 UPPER SURFACE CP VALUES. TRANSITION 1.

| ETA= X/C | 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.7874 | 0.5967 | 0.4808 | 0.7261 | 0.7268 | 0.7629 | 0.7450 | 0.7665 |
| 0.010 | 0.4040 | 0.0356 | -0.1512 | -0.0437 | -0.0558 | -0.0300 | -0.0817 | -0.2280 |
| 0.025 | 0.1900 | -0.1822 | -0.2316 | -0.1524 | -0.1506 | -0.1028 | -0.0478 | 0.0583 |
| 0.050 | -0.1980 | -0.5544 | -0.6038 | -0.6134 | -0.5582 | -0.5799 | -0.4237 | -0.5318 |
| 0.075 | -0.3473 | -0.6063 | -0.7252 | -0.6614 | -0.6534 | -0.6534 | -0.6364 | -0.5865 |
| 0.100 | -0.3747 | -0.7362 | -0.7859 | -0.8023 | -0.7722 | -0.7166 | -0.7117 | -0.6001 |
| 0.150 | -0.4912 | -0.7775 | -0.8634 | -0.9103 | -0.7802 | -0.7311 | -0.7171 | -0.5700 |
| 0.200 | -0.6301 | -0.8138 | -0.8890 | -0.9714 | -0.7807 | -0.7463 | -0.6963 | -0.6419 |
| 0.250 | -0.7016 | -0.8582 | -0.9015 | -0.9732 | -0.7912 | -0.7463 | -0.6587 | -0.6303 |
| 0.300 | -0.6737 | -0.8730 | -0.9132 | -0.9698 | -0.7954 | -0.7505 | -0.7048 | -0.5925 |
| 0.350 | -0.6969 | -0.8465 | -0.8857 | -0.9452 | -0.8070 | -0.7198 | -0.6928 | -0.6043 |
| 0.400 | -0.6335 | -0.8182 | -0.9158 | -0.9333 | -0.8464 | -0.7487 | -0.6884 | -0.6338 |
| 0.450 | -0.6397 | -0.7485 | -0.9343 | -0.9004 | -0.8399 | -0.7566 | -0.6990 | -0.6580 |
| 0.500 | -0.6093 | -0.6953 | -0.9224 | -0.8703 | -0.8519 | -0.7545 | -0.6971 | -0.6933 |
| 0.550 | -0.5851 | -0.6584 | -0.8321 | -0.8665 | -0.8712 | -0.7919 | -0.7274 | -0.5835 |
| 0.600 | -0.5790 | -0.6163 | -0.7551 | -0.8567 | -0.9009 | -0.8297 | -0.5849 | -0.2560 |
| 0.650 | -0.5851 | -0.5812 | -0.6510 | -0.8610 | -0.4356 | -0.4180 | -0.3187 | -0.2035 |
| 0.700 | -0.5602 | -0.4473 | -0.3454 | -0.4881 | -0.3269 | -0.2958 | -0.2787 | -0.1850 |
| 0.750 | -0.3686 | -0.2135 | -0.2066 | -0.3104 | -0.3069 | -0.2127 | -0.2409 | -0.1539 |
| 0.800 | -0.2010 | -0.1265 | -0.1306 | -0.2290 | -0.2503 | -0.1605 | -0.1893 | -0.0960 |
| 0.850 | -0.1139 | -0.0632 | -0.0644 | -0.1418 | -0.1769 | -0.1080 | -0.1027 | -0.0207 |
| 0.900 | -0.0598 | -0.0003 | 0.0058 | -0.0587 | -0.0558 | -0.0435 | -0.0358 | 0.0383 |
| 0.950 | -0.0012 | 0.0692 | 0.0863 | 0.0271 | -0.0487 | -0.0138 | 0.0450 | 0.1089 |
| 0.990 | 0.0522 | 0.1263 | 0.1377 | 0.0868 | -0.0075 | 0.0212 | 0.0689 | 0.1273 |
| 1.000 | 0.0725 | 0.1364 | 0.1840 | | 0.0038 | 0.0197 | 0.0871 | 0.1388 |

MACH=0.879 ALPHA=0.467 CL=0.405 LOWER SURFACE CP VALUES. TRANSITION 1.

| ETA= X/C | 0.019 | 0.123 | 0.231 | 0.325 | 0.455 | 0.633 | 0.817 | 0.935 |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.7874 | 0.5967 | 0.4608 | 0.7261 | 0.7260 | 0.7629 | 0.7450 | 0.7665 |
| 0.010 | 0.2603 | 0.0887 | 0.1057 | 0.1247 | | -0.0059 | 0.0340 | 0.0377 |
| 0.025 | 0.1025 | 0.0234 | 0.0214 | 0.0698 | 0.0224 | -0.0314 | 0.0043 | 0.0040 |
| 0.050 | 0.0231 | -0.0888 | -0.0703 | -0.0420 | -0.0629 | -0.1544 | -0.0853 | |
| 0.075 | -0.0044 | -0.1060 | -0.1717 | -0.0850 | -0.0095 | -0.1557 | -0.1220 | -0.1415 |
| 0.100 | -0.0288 | -0.1521 | -0.1528 | -0.1531 | -0.1224 | -0.1741 | -0.1739 | -0.2135 |
| 0.160 | -0.0698 | -0.2476 | -0.2118 | -0.1692 | -0.1838 | -0.2100 | -0.2357 | -0.2721 |
| 0.220 | -0.1499 | -0.2599 | -0.2825 | | -0.2570 | -0.2616 | -0.2787 | -0.3365 |
| 0.280 | -0.2024 | -0.2996 | -0.3213 | -0.3292 | -0.3162 | | -0.3580 | -0.4106 |
| 0.340 | -0.2347 | -0.3191 | -0.3528 | -0.3759 | -0.3414 | -0.3395 | -0.3997 | -0.4173 |
| 0.400 | -0.2428 | -0.3051 | -0.3540 | -0.3588 | -0.3635 | -0.3107 | -0.3547 | -0.4046 |
| 0.460 | -0.2414 | -0.2680 | -0.2777 | -0.3214 | -0.2931 | -0.2577 | -0.2684 | -0.3357 |
| 0.520 | -0.2169 | -0.2102 | -0.2187 | -0.2317 | -0.1965 | -0.1588 | -0.1491 | -0.1906 |
| 0.580 | -0.1577 | -0.1427 | -0.1629 | -0.1525 | -0.0957 | -0.0487 | -0.0498 | -0.0894 |
| 0.640 | -0.0911 | -0.0027 | -0.0803 | -0.0694 | | 0.0478 | 0.0449 | 0.0298 |
| 0.700 | -0.0242 | -0.0052 | -0.0341 | 0.0015 | 0.0783 | 0.1249 | 0.1125 | 0.0974 |
| 0.760 | 0.0464 | 0.0885 | 0.0570 | 0.0711 | 0.1440 | 0.1830 | 0.1675 | 0.1518 |
| 0.820 | 0.1004 | 0.1369 | 0.1405 | 0.1339 | 0.2041 | 0.2220 | 0.1972 | 0.1912 |
| 0.880 | 0.1601 | 0.2162 | 0.2232 | 0.1355 | 0.2404 | 0.2525 | 0.2200 | 0.2160 |
| 0.940 | 0.1990 | 0.2503 | 0.2843 | 0.2267 | 0.2497 | 0.2410 | 0.2233 | 0.2080 |
| 0.990 | 0.1507 | 0.2483 | 0.2328 | 0.1930 | 0.1507 | 0.0878 | 0.1639 | 0.1155 |
| 1.000 | 0.0725 | 0.1364 | 0.1840 | | 0.0038 | 0.0197 | 0.0071 | 0.1388 |

TABLE 8.7 (contd) M100 WING PRESSURE DISTRIBUTIONS




SCALE 1:23

FIGURE 8.1 DETAILS OF WING-BODY MODEL M100

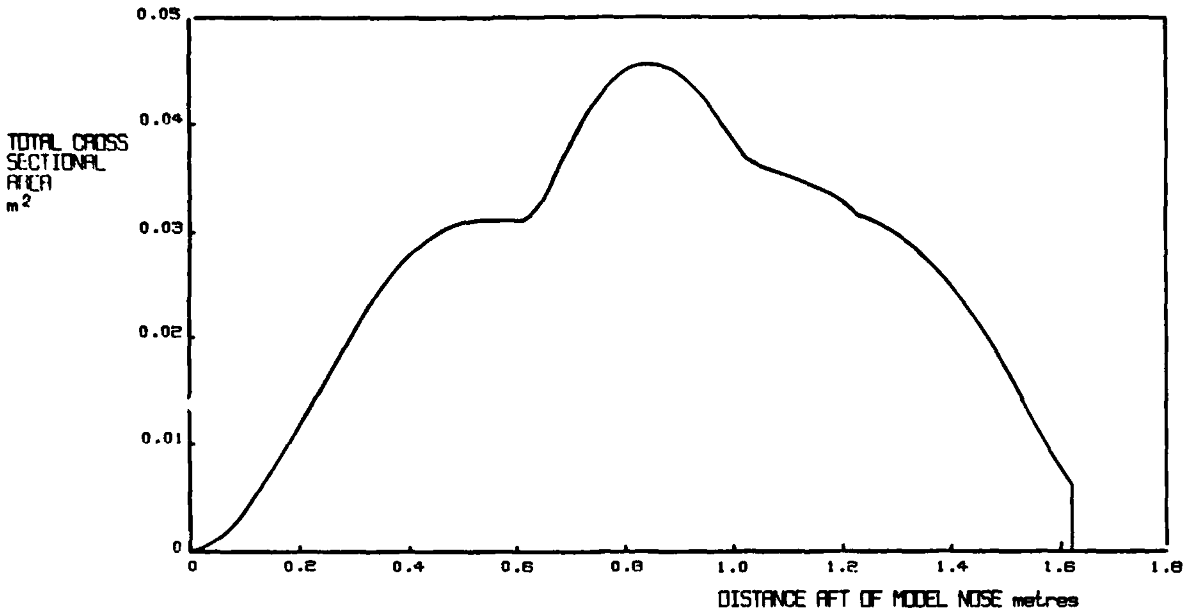



FIGURE 8.2 CROSS-SECTIONAL DEVELOPMENT

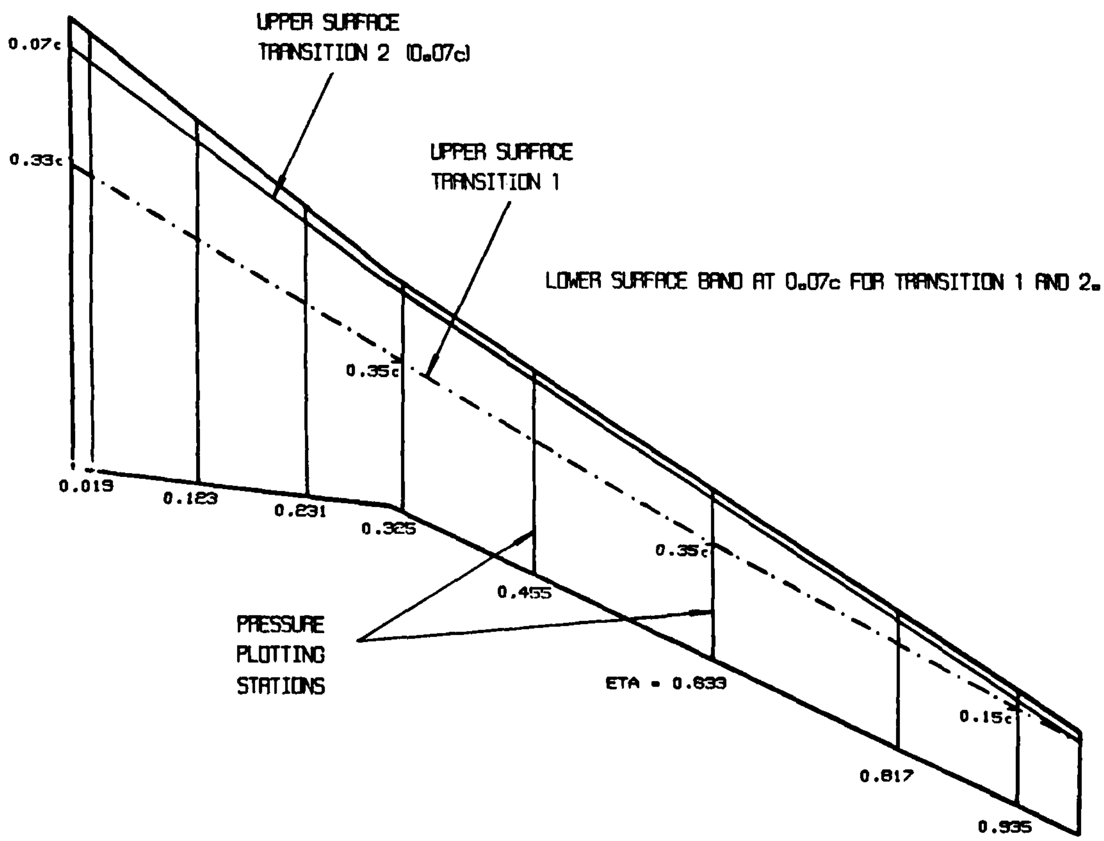



FIGURE 8.3 TRANSITION POSITION

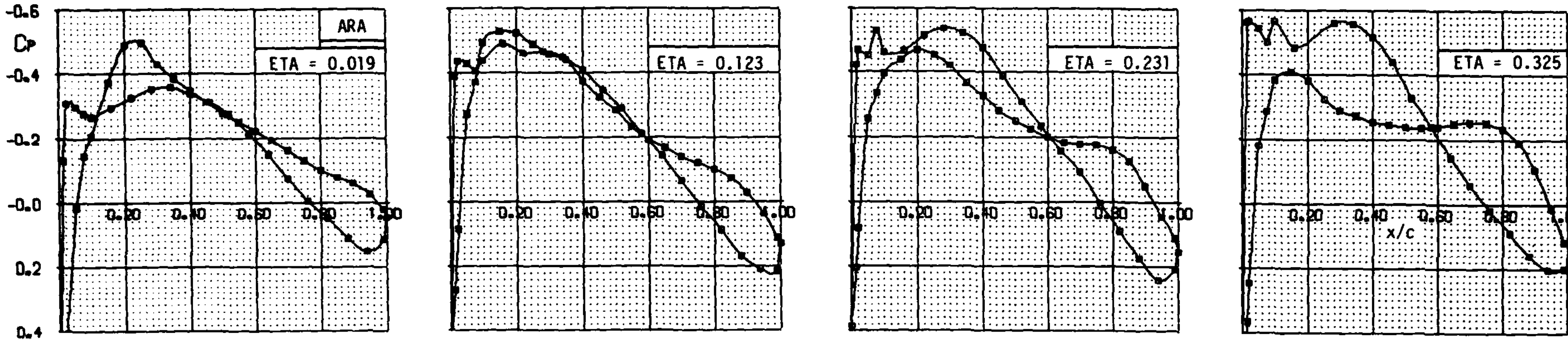
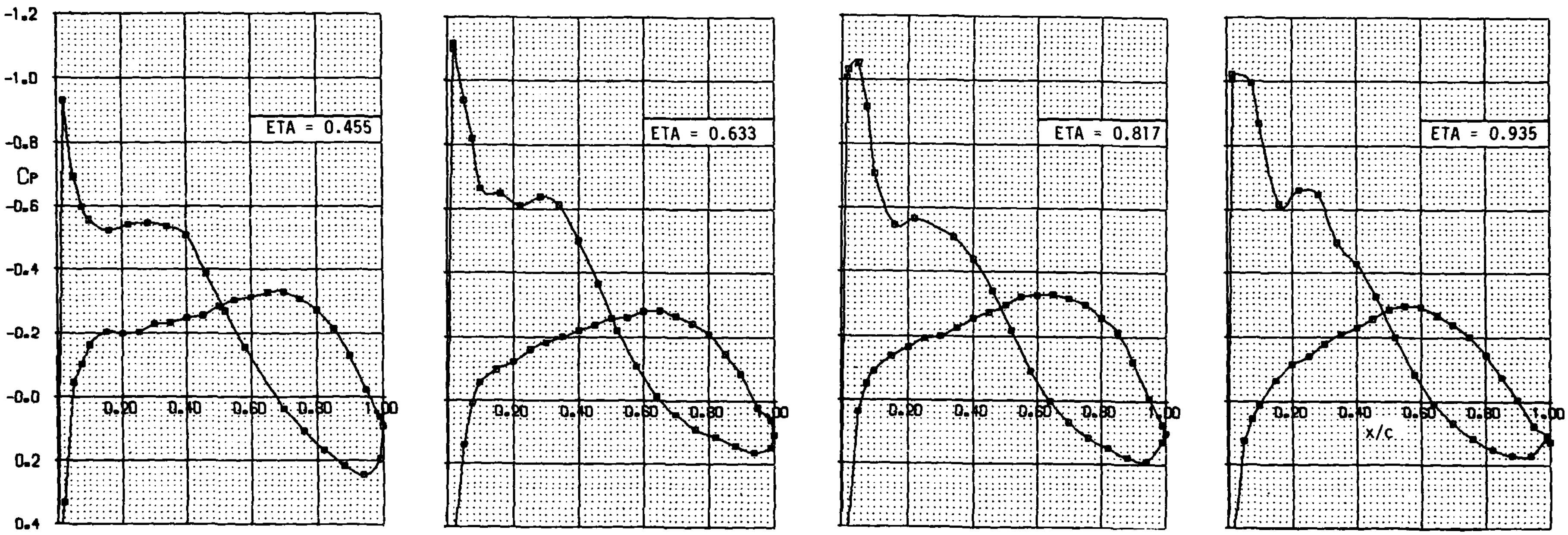



FIGURE 8.4

M100 WING PRESSURE DISTRIBUTIONS

M = 0.8001 $C_L$ = -0.0232
TRANSITION 1



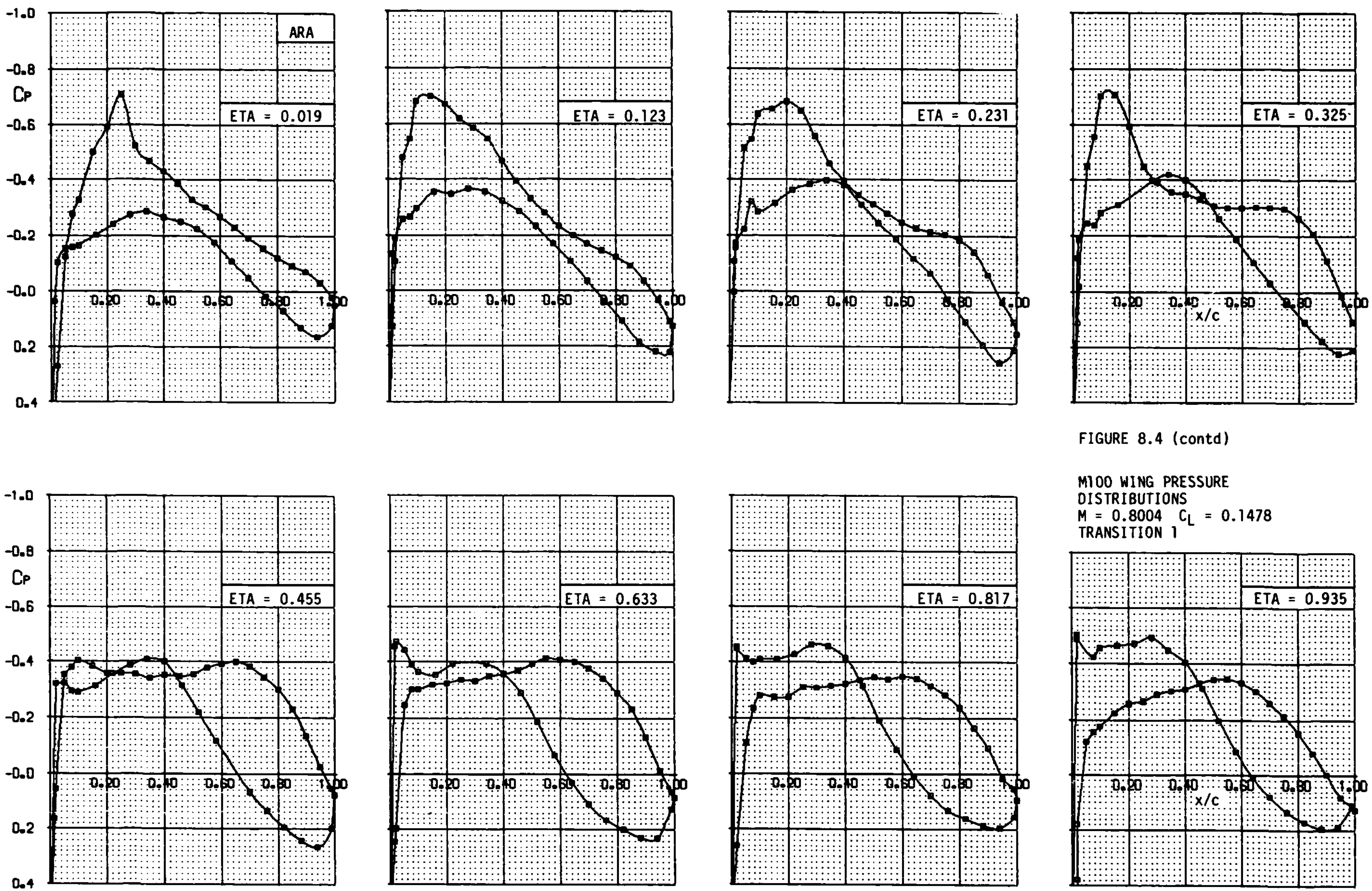



FIGURE 8.4 (contd)

M100 WING PRESSURE DISTRIBUTIONS
$M = 0.8004$ $C_L = 0.1478$
TRANSITION 1

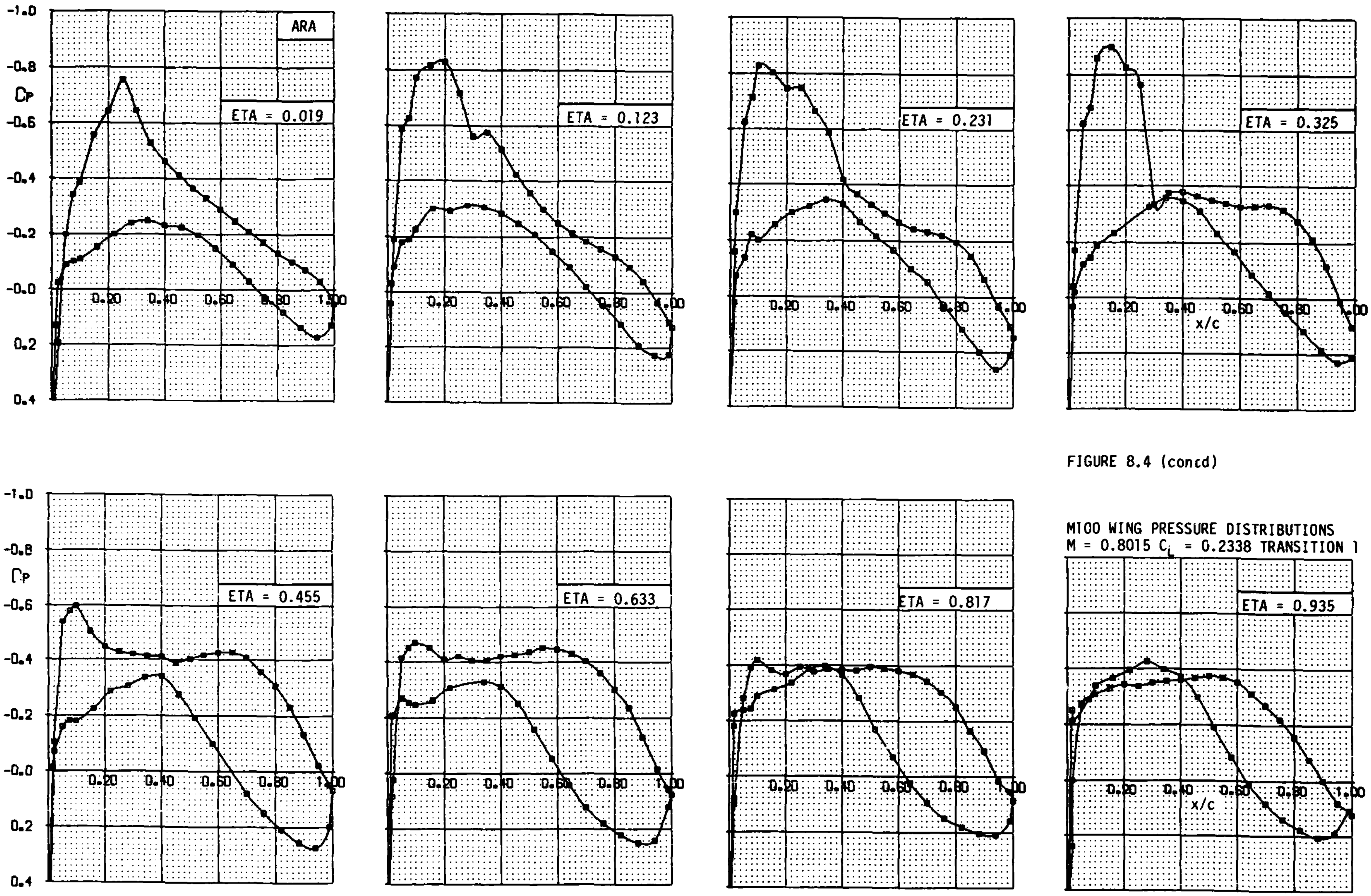



FIGURE 8.4 (concd)

M100 WING PRESSURE DISTRIBUTIONS
M = 0.8015 $C_L$ = 0.2338 TRANSITION 1

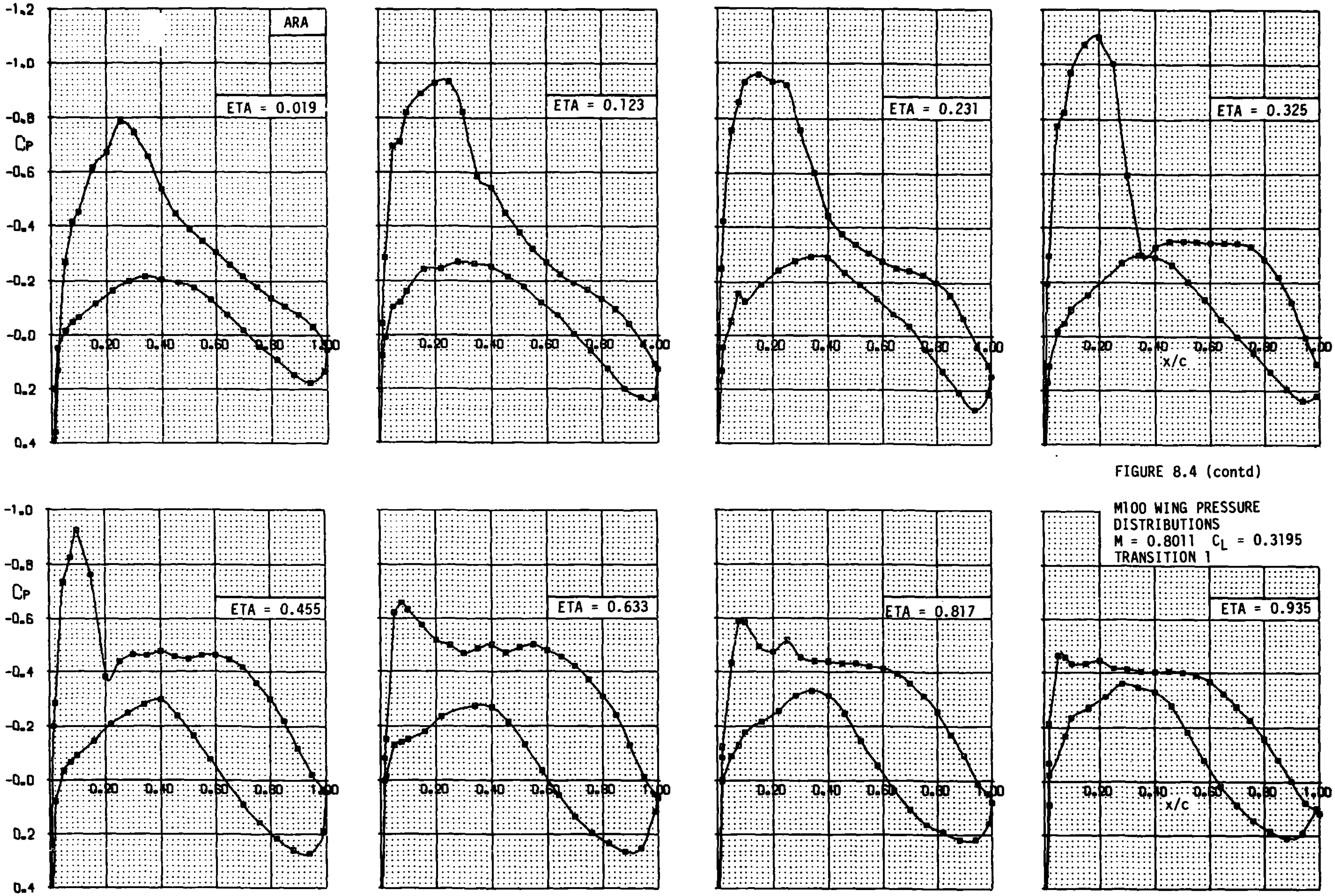



FIGURE 8.4 (contd)

M100 WING PRESSURE
DISTRIBUTIONS
M = 0.8011  $C_L$ = 0.3195
TRANSITION 1

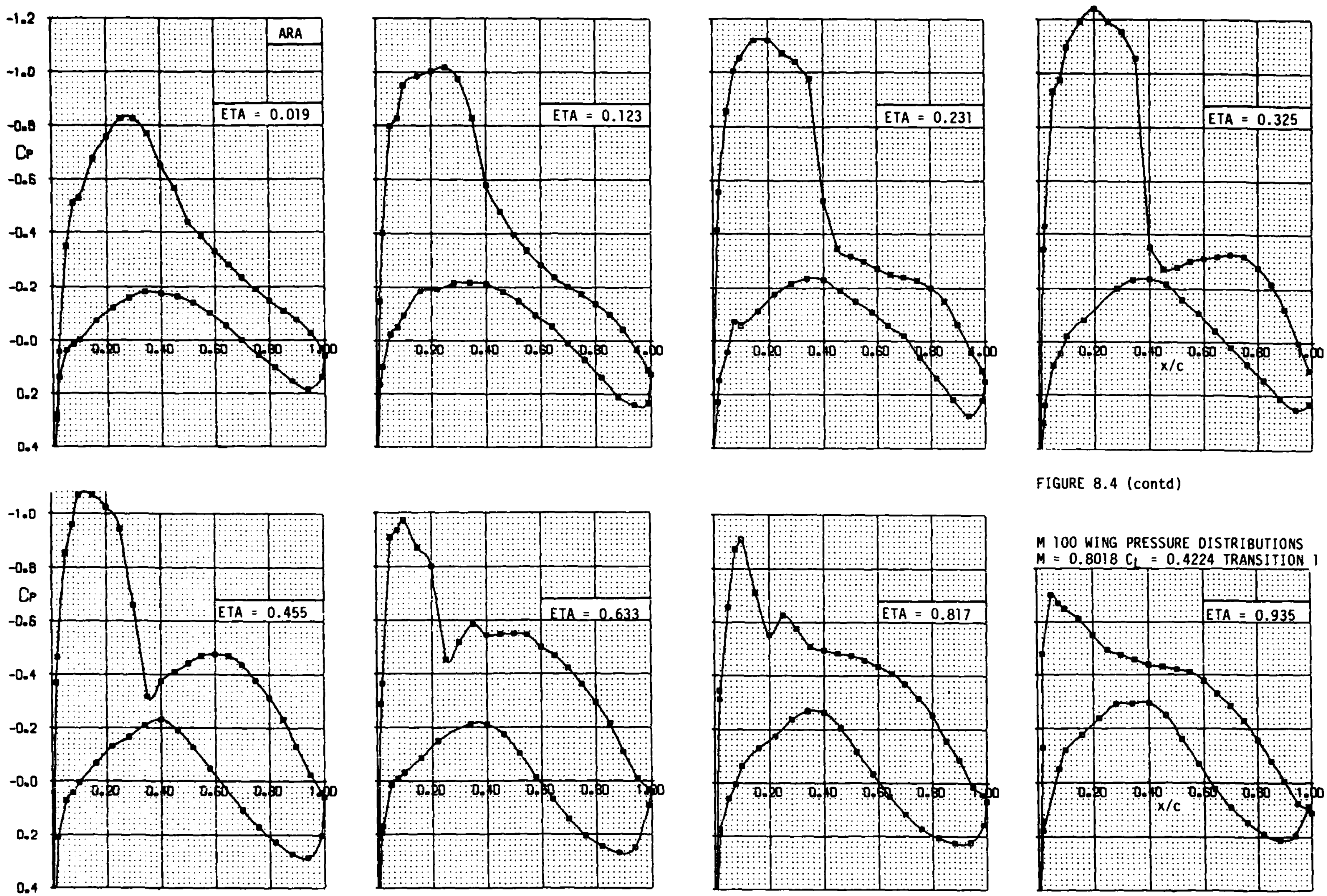



FIGURE 8.4 (contd)

M 100 WING PRESSURE DISTRIBUTIONS
M = 0.8018 $C_L$ = 0.4224 TRANSITION 1

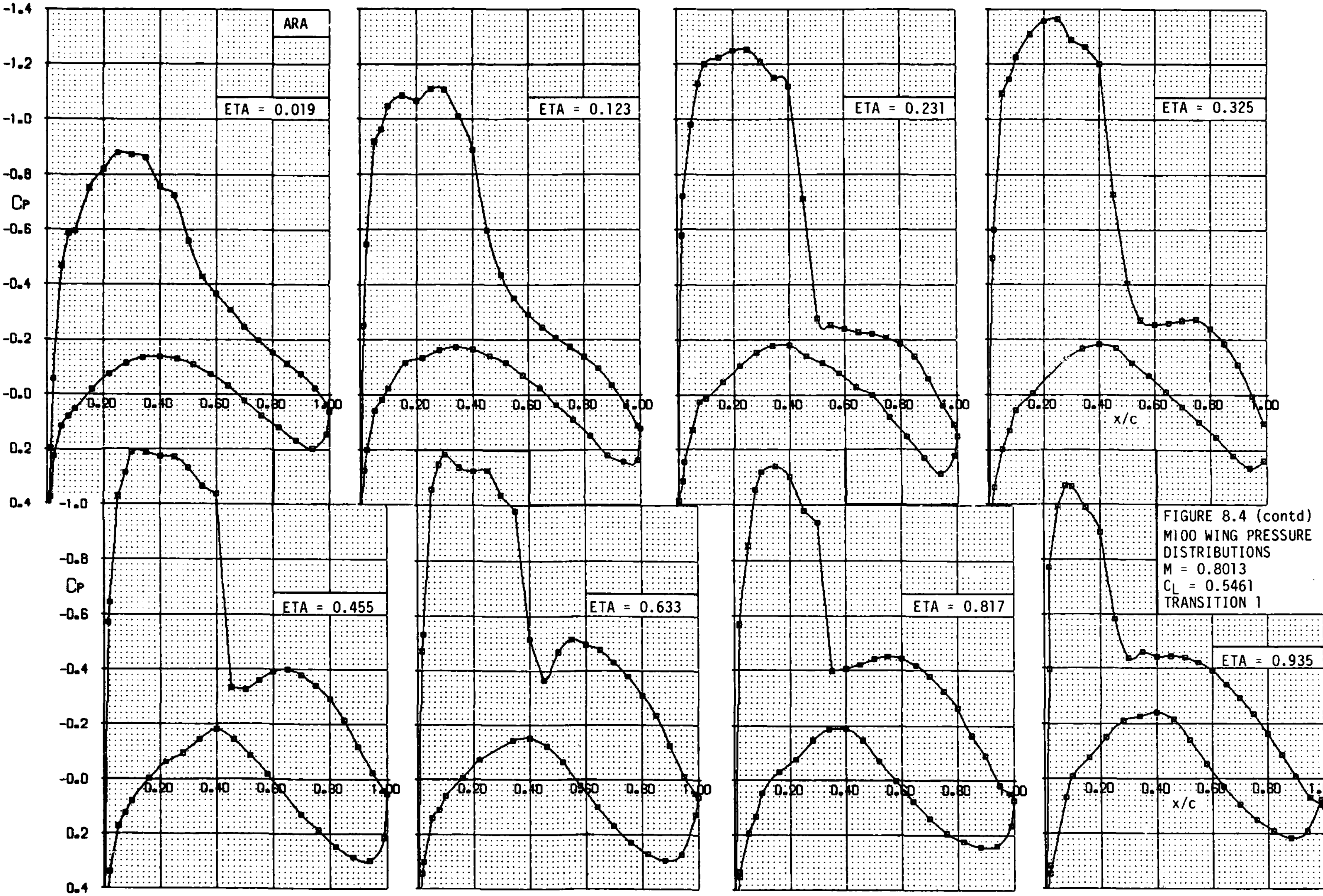



FIGURE 8.4 (contd)
M100 WING PRESSURE
DISTRIBUTIONS
M = 0.8013
$C_L$ = 0.5461
TRANSITION 1

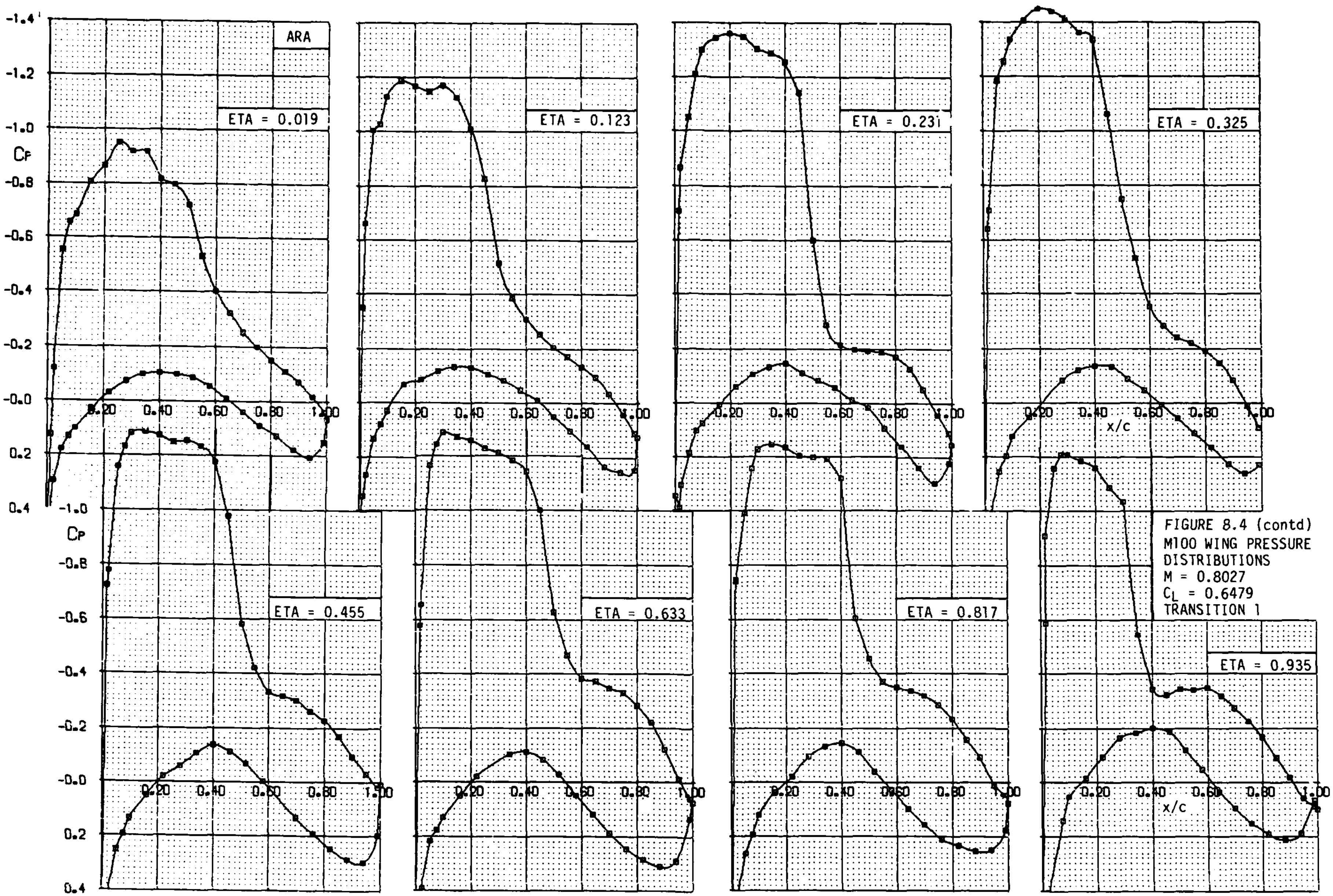



FIGURE 8.4 (contd)
M100 WING PRESSURE DISTRIBUTIONS
M = 0.8027
$C_L$ = 0.6479
TRANSITION 1

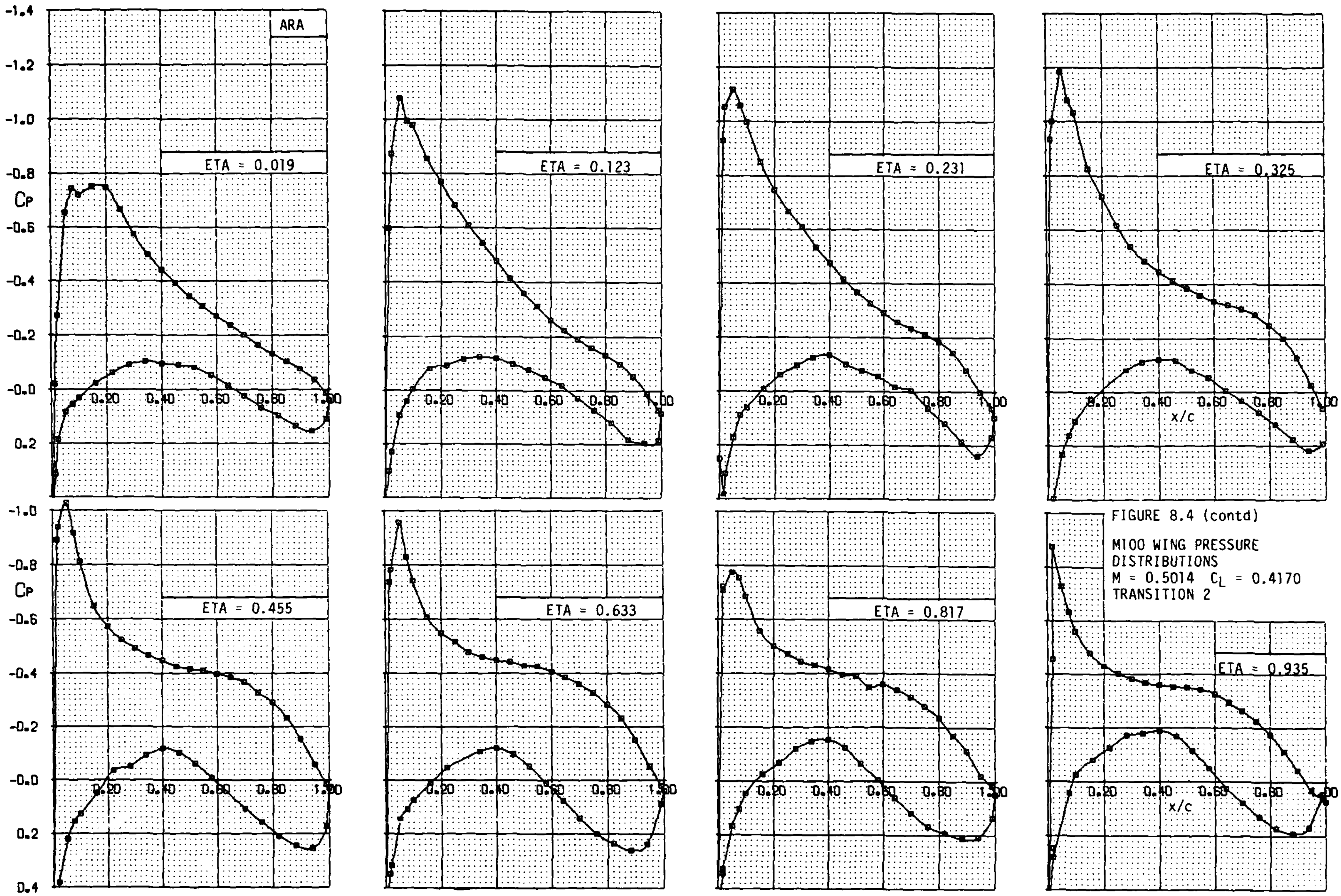



FIGURE 8.4 (contd)

M100 WING PRESSURE DISTRIBUTIONS
M = 0.5014 $C_L$ = 0.4170
TRANSITION 2

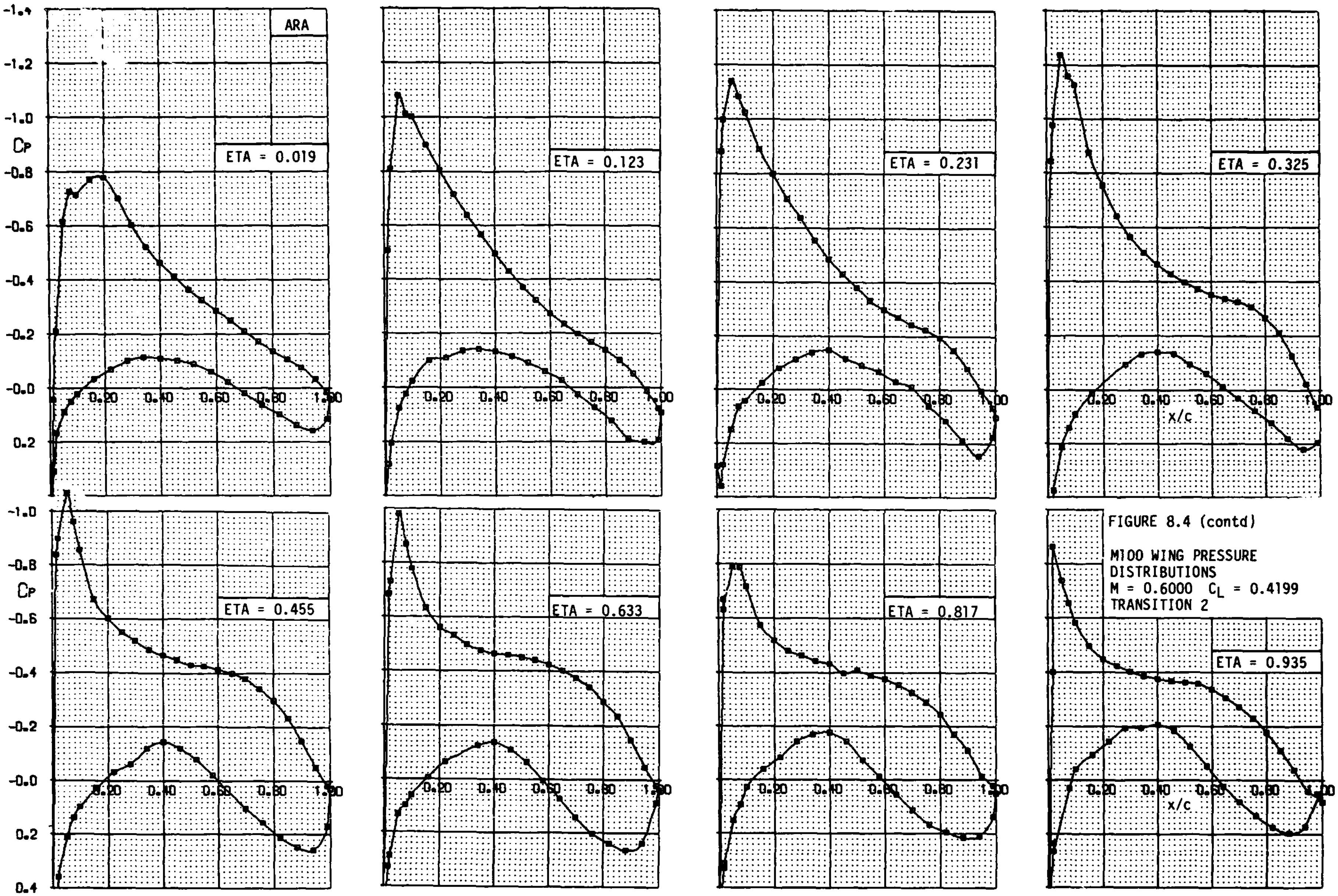



FIGURE 8.4 (contd)

M100 WING PRESSURE DISTRIBUTIONS
$M = 0.6000 \quad C_L = 0.4199$
TRANSITION 2

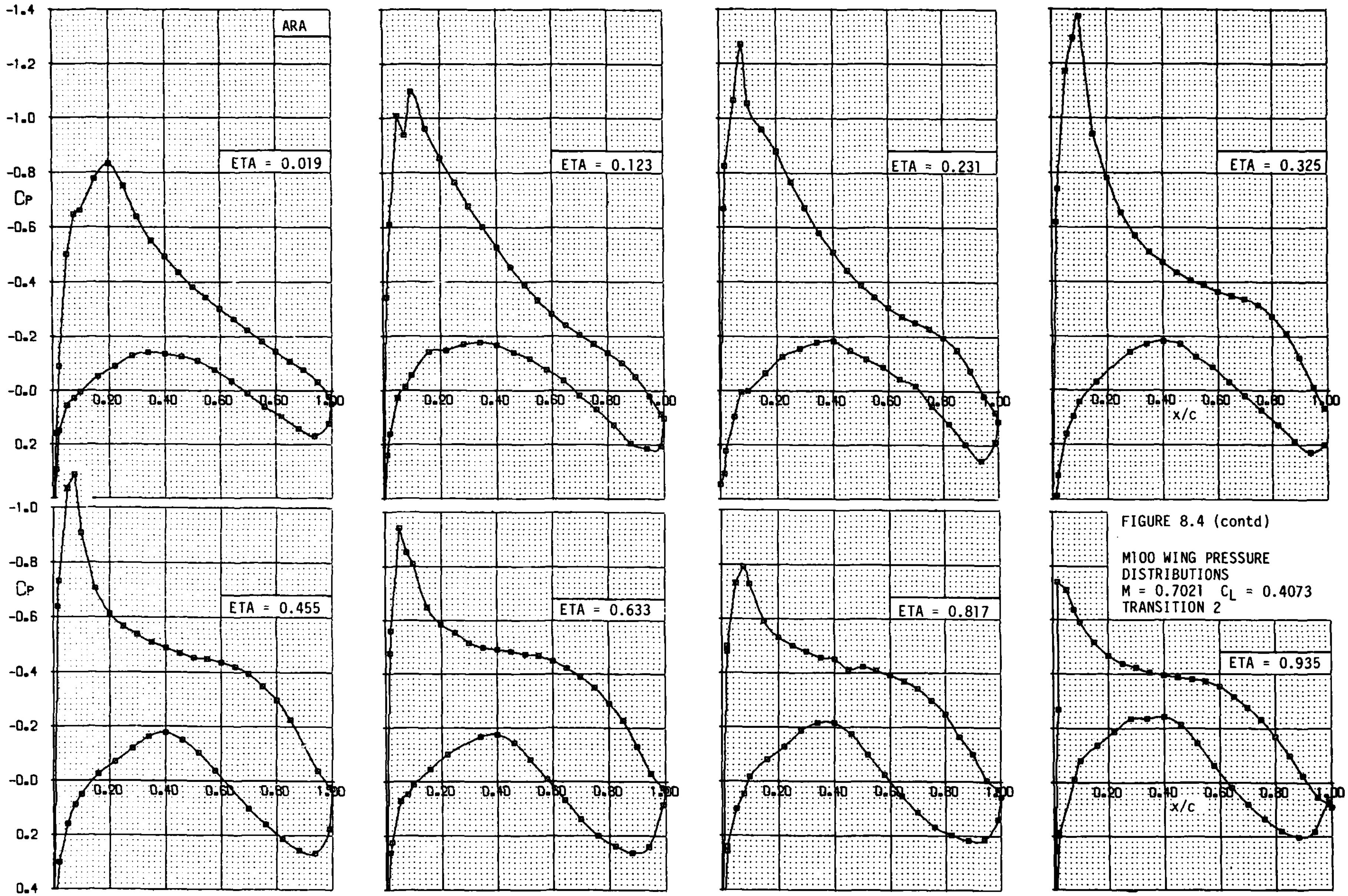



FIGURE 8.4 (contd)

M100 WING PRESSURE DISTRIBUTIONS
M = 0.7021 $C_L$ = 0.4073
TRANSITION 2

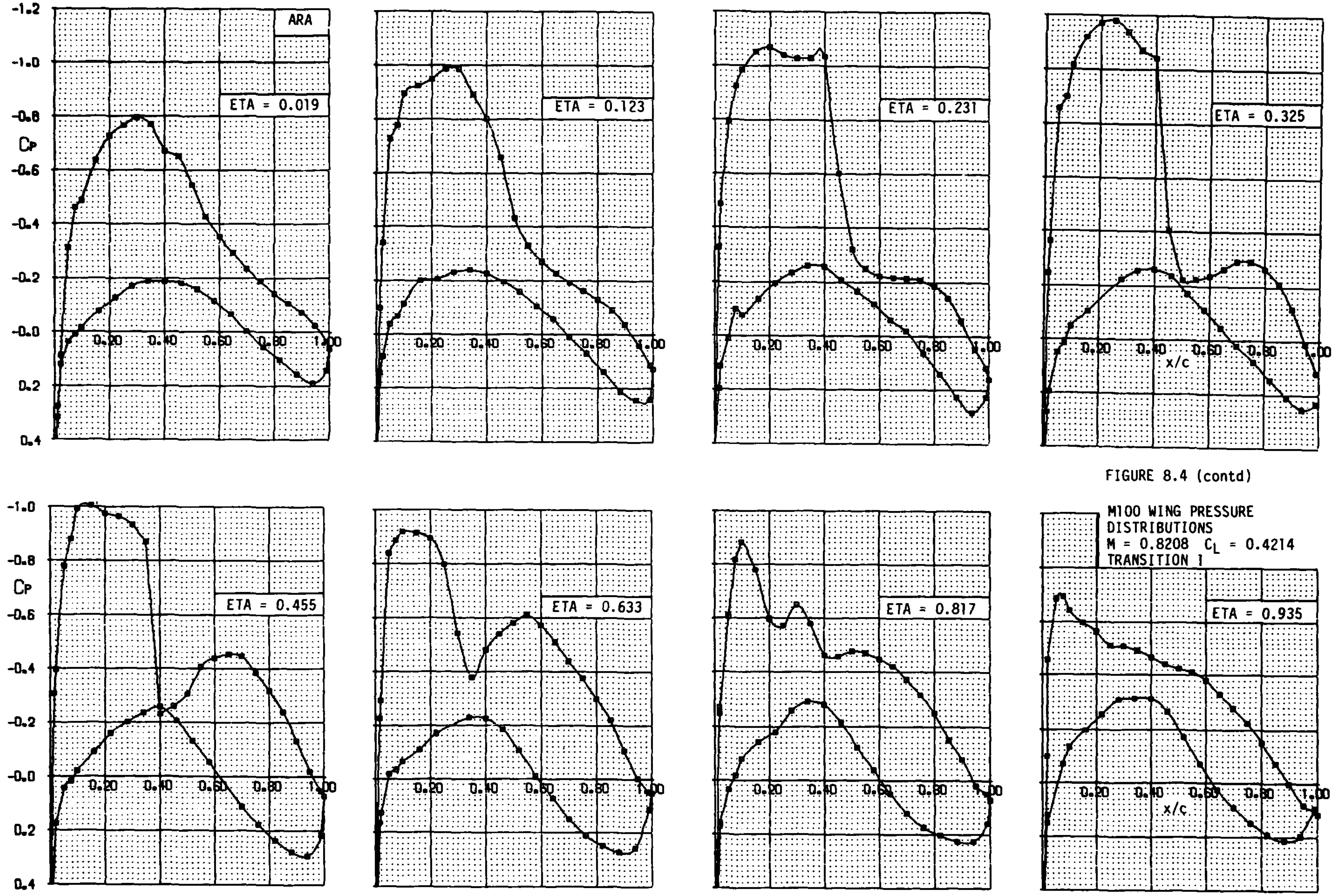



FIGURE 8.4 (contd)

M100 WING PRESSURE
DISTRIBUTIONS
M = 0.8208 $C_L$ = 0.4214
TRANSITION 1

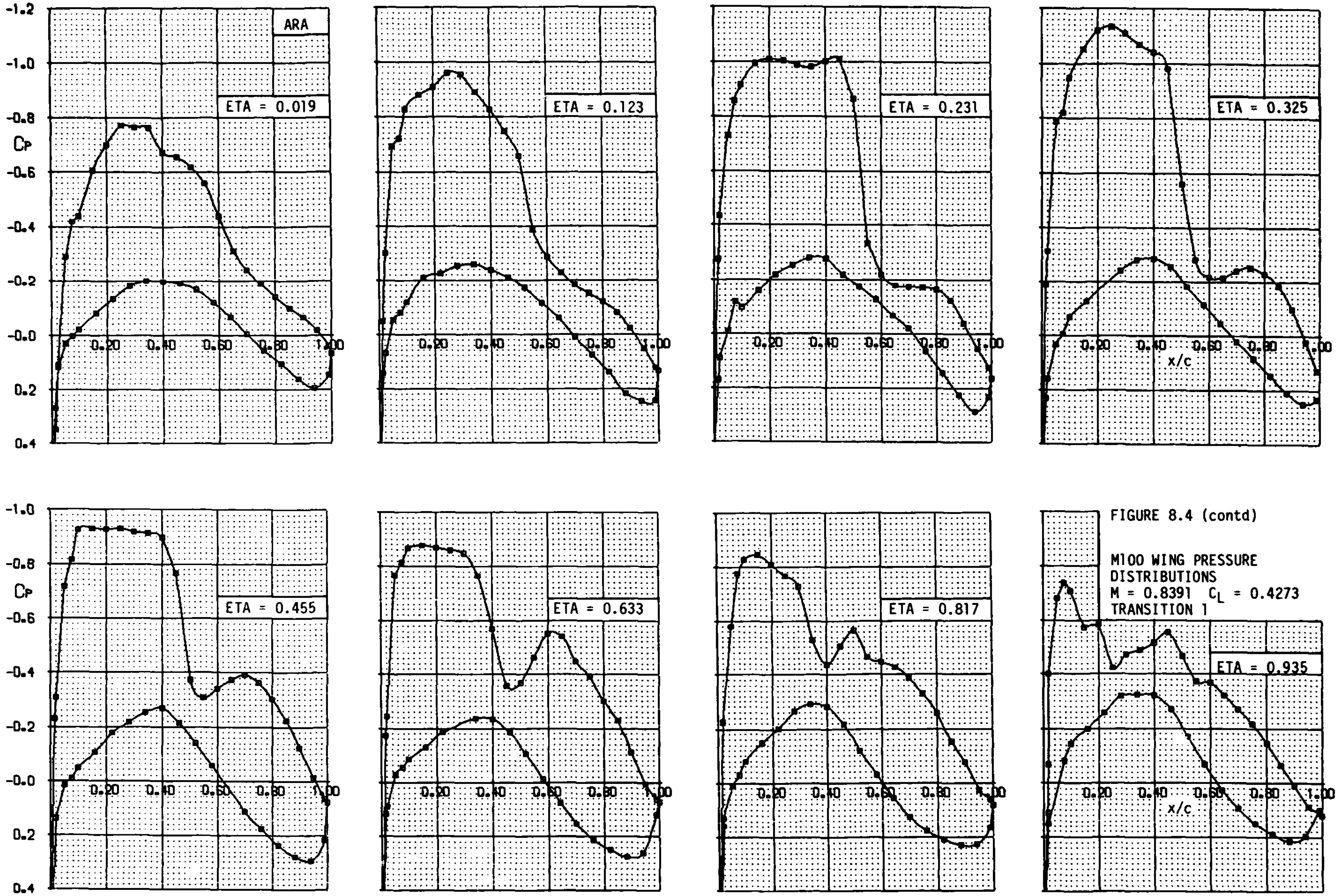



FIGURE 8.4 (contd)

M100 WING PRESSURE DISTRIBUTIONS
$M = 0.8391 \quad C_L = 0.4273$
TRANSITION 1

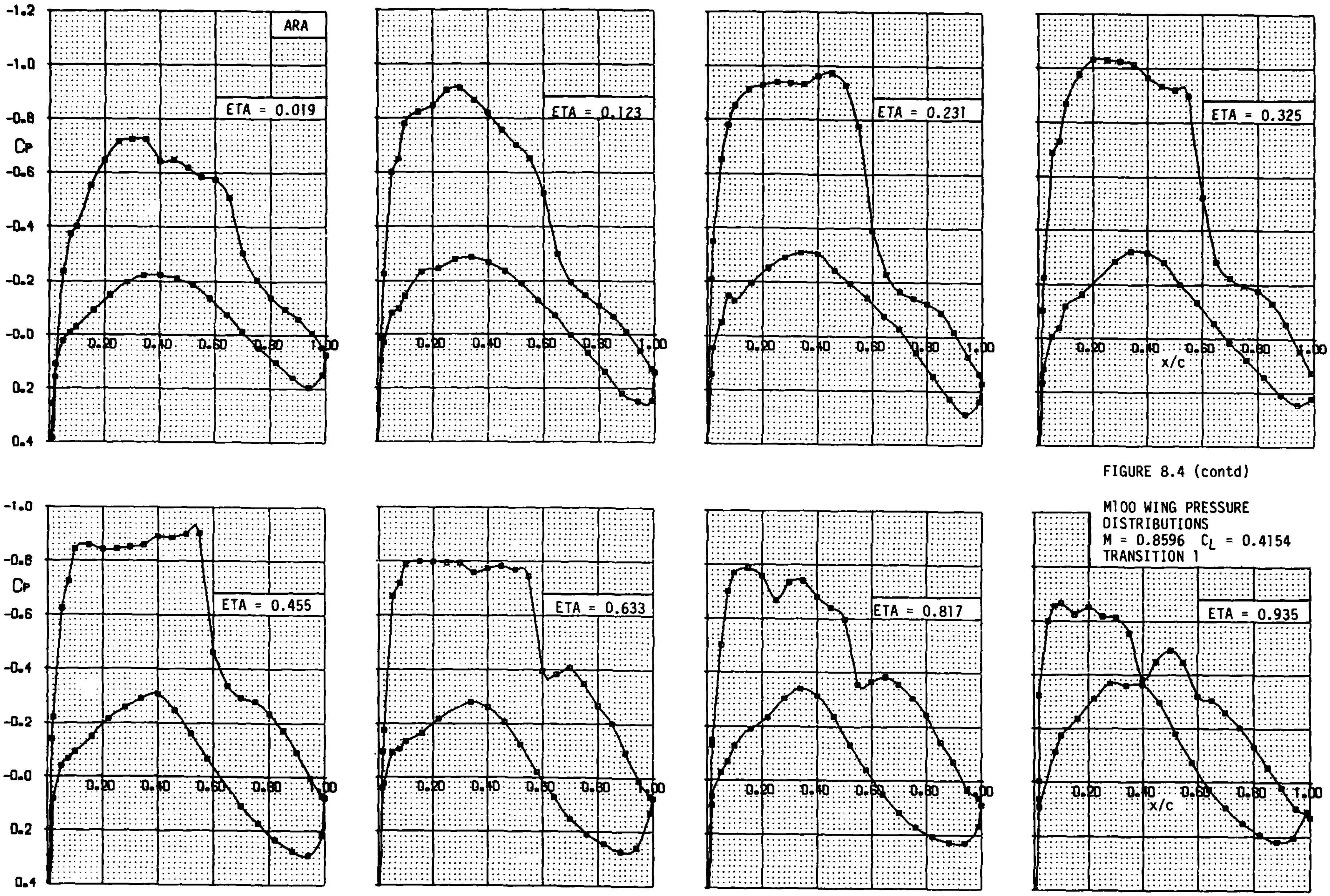



FIGURE 8.4 (contd)

M100 WING PRESSURE DISTRIBUTIONS
$M = 0.8596$ $C_L = 0.4154$
TRANSITION 1

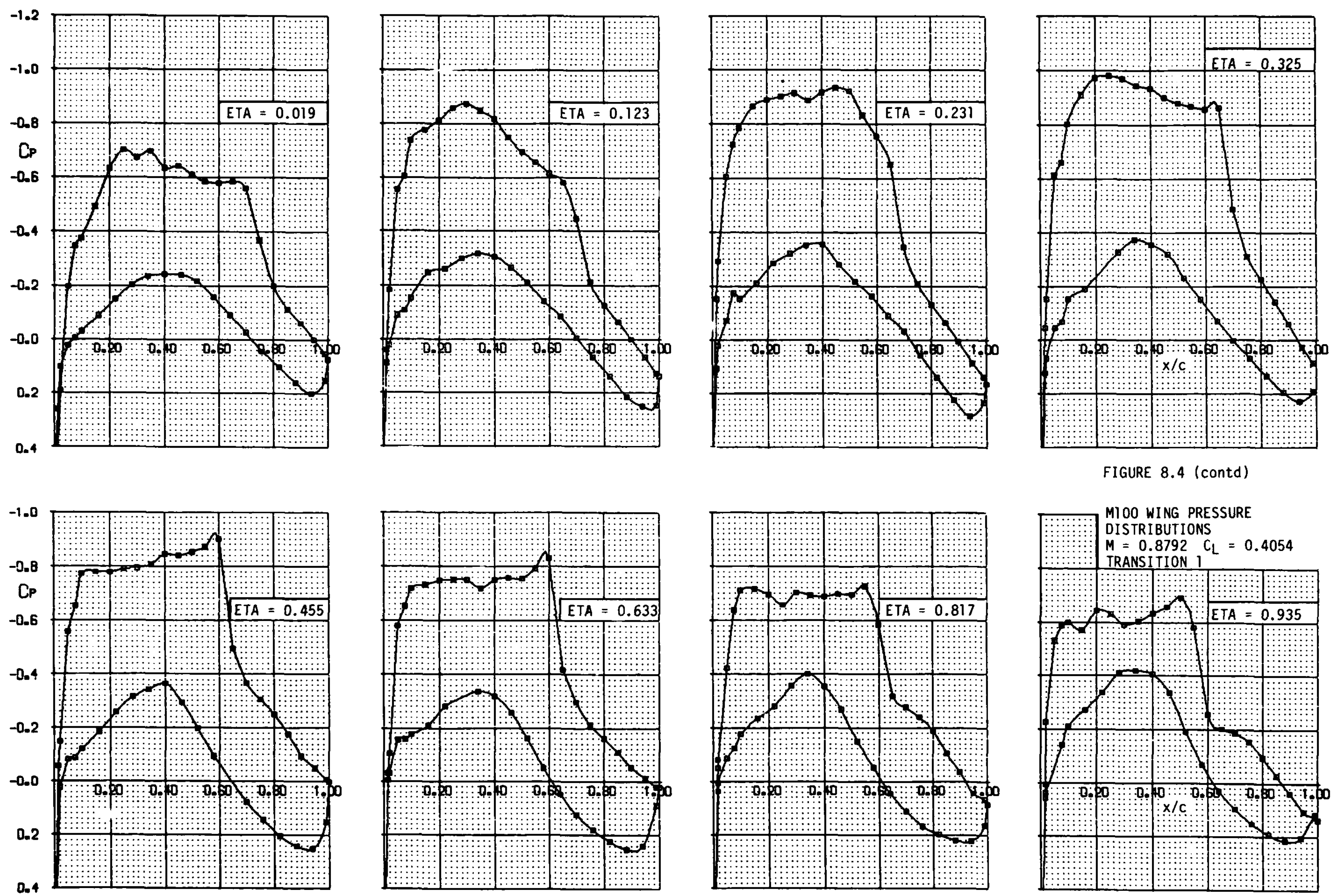



FIGURE 8.4 (contd)

M100 WING PRESSURE DISTRIBUTIONS
$M = 0.8792 \quad C_L = 0.4054$
TRANSITION 1

# 9. *PRESSURE DISTRIBUTIONS MEASURED ON RESEARCH WING M86 MOUNTED ON AN AXISYMMETRIC BODY*

by

M P Carr
Aircraft Research Association Limited
Manton Lane, Bedford MK41 7PF, UK

## 9.1 INTRODUCTION

This contribution contains selected data from measurements of surface pressure distributions on a research wing in the ARA 9ft x 8ft transonic wind tunnel. Tabulated data are given for seven conditions covering three Mach numbers. Overall force measurements for the same test conditions as the presented pressures are also given.

## 9.2 DATA SET

1 General Description

| | |
|---|---|
| 1.1 Model Designation or Name | M86 |
| 1.2 Model Type (eg Full Span Wing-Body, Semi-Span Wing) | Full span wing-body |
| 1.3 Design Requirements/Conditions | Combat wing research model |
| 1.4 Additional Remarks | M86 was a combat wing research model with a square fuselage and a high mounted wing. |

2 Model Geometry

2.1 Wing Data

| | |
|---|---|
| 2.1.1 Wing Planform | Straight wing with curved tip, see Figure 9.1 |
| 2.1.2 Aspect Ratio | 4.0 |
| 2.1.3 Leading-Edge Sweep | 40° |
| 2.1.4 Trailing-Edge Sweep | 13.5° |
| 2.1.5 Taper Ratio | 0.25 (tip chord/body centre line chord) |
| 2.1.6 Twist | Included in ordinates of Table 9.1 |
| 2.1.7 Standard Mean Chord | 0.279 m |
| 2.1.8 Span or Semispan | 1.118 m span |
| 2.1.9 Number of Airfoil Sections used to Define wing | 12 sections are used to define wing but 47 sections were specified for model manufacture |
| 2.1.10 Spanwise Location of Reference Section and Section Coordinates (Note if Ordinates are Design or Actual Measured Values) | Design ordinates for 12 sections are listed in Table 9.1 |
| 2.1.11 Lofting Procedure between Reference Sections | Piecewise cubics |
| 2.1.12 Form of Wing-Body Fillet, Strakes | None |
| 2.1.13 Form of Wing Tip | Curved |

| | |
|---|---|
| 2.2 Body Data (Detail Description of Body Geometry) | Square with rounded corners. Nose defined by cubic, tail defined by quadratic. See Figure 9.1 |

2.3 Wing-Body Combination

| | |
|---|---|
| 2.3.1 Relative Body Diameter (Average Body Diameter at Wing Location Divided by Wing Span) | 0.22 |
| 2.3.2 Relative Vertical Location of Wing (Height above or Below Body Axes Divided by Average Body Radius at Wing Location) | 0.62 |
| 2.3.3 Wing Setting Angle | 2° |
| 2.3.4 Dihedral | Included in ordinates of Table 9.1 |

| | | |
|---|---|---|
| 2.4 | Cross Sectional Area Development | See Figure 9.2 and Table 9.2 |
| 2.5 | Fabrication Tolerances/Waviness | ±0.05 mm |
| 2.6 | Additional Remarks | Nil |

3 Wind Tunnel

| | | |
|---|---|---|
| 3.1 | Designation | ARA 9ft x 8ft TWT |
| 3.2 | Type of Tunnel | |
| 3.2.1 | *Continuous or Blowdown. Indicate Minimum Run Time if Applicable* | *Continuous* |
| 3.2.2 | Stagnation Pressure | 0.8 to 1.2 bar |
| 3.2.3 | Stagnation Temperature | Up to 50° C |
| 3.3 | Test Section | |
| 3.3.1 | Shape of Test Section | Rectangular |
| 3.3.2 | Size of Test Section (Width, Height, Length) | 2.74 m x 2.44 m x 3.66 m |
| 3.3.3 | Type of Test Section, Closed, Open, Slotted, Perforated. | Perforated |
| | Open Area Ratio (Give Range if Variable) | 22% |
| | Slot/Hole Geometry (eg 30-degree Slanted Holes) | Normal holes vented into large plenum chamber |
| | Treatment of Sidewall Boundary Layer | |
| | Full span models ) Half model testing) | Tunnel has capability for full and half span model testing |
| 3.4 | Flow Field (Empty Test Section) | |
| 3.4.1 | Reference Static Pressure | Plenum Chamber |
| 3.4.2 | Flow Angularity | Up to +0.15° in vicinity of model. (This is mainly due to the working section flow being horizontal and the roof set at +0.3° to allow for the boundary layer growth in the working section. |
| 3.4.3 | Mach Number Distribution | ΔM = ±0.002 (see Reference 1) |
| 3.4.4 | Pressure Gradient | Insignificant over the length of the current model (see Reference 1) |
| 3.4.5 | Turbulence/Noise Level | - |
| 3.4.6 | Sidewall Boundary Layer | - |
| 3.5 | Freestream Mach number (or Velocity) | |
| 3.5.1 | Range | 0 to 1.4 |
| 3.5.2 | Pressures used to Determine Mach Number (eg Settling Chamber Total Pressure and Plenum Chamber Pressure) | Settling chamber total pressure (with a small correction applied), and plenum chamber static pressure. |
| 3.5.3 | Accuracy of Mach Number Determination (ΔM) | ΔM = ±0.001 |
| 3.5.4 | Maximum Mach Number Variation in x,y,z - Direction (Empty Tunnel Specify at what Mach Number) | Streamwise variation of ΔM = ±0.002 over Mach number range. |
| | Maximum Variation of Flow Direction | - |
| | Maximum Mach Number Variation During a Traverse | ΔM = ±0.001 |

| | | |
|---|---|---|
| 3.6 | Reynolds Number Range | |
| 3.6.1 | Unit Reynolds Number Range. (Give Range at Representative Mach Numbers: 1/m) | M = 0.40 R/M $8.5 \times 10^6$ ±20%<br>0.80 $13.0 \times 10^6$ ±20%<br>1.40 $14.8 \times 10^6$ ±20% |
| 3.6.2 | Means of Varying Reynolds Number (eg by Pressurisation) | Pressurisation (= ±0.2 bar) |
| 3.7 | Temperature Range of Dewpoint Can Temperature be Controlled? | Most runs made at 300 to 320 K stagnation temperature. Temperature and dewpoint both controlled. Dewpoint temperature 250°K for supersonic running. |
| 3.8 | Model Attitudes | |
| 3.8.1 | Angle of Attack, Yaw, Roll | Incidence -10° to 22° Roll ±180° |
| 3.8.2 | Accuracy in Determining Angles | Incidence ±0.01° Roll ±0.1° |
| 3.9 | Organisation Operating the Tunnel and Location of Tunnel | Aircraft Research Association Limited<br>Manton Lane, Bedford, England |
| 3.10 | Who is to be Contacted for Additional Information? | Chief Aerodynamicist, ARA. |
| 3.11 | Literature Concerning this Facility | Reference 1<br>Reference 2 |
| 3.12 | Additional Remarks | Nil |

4 Tests

| | | |
|---|---|---|
| 4.1 | Type of Tests | Surface pressures overall force and moment measurements, surface oil flow visualisation |
| 4.2 | Wing Span or Semispan to Tunnel Width | $\frac{\text{Wing Span}}{\text{Tunnel Width}} = 0.40$ |
| 4.3 | Test Conditions | |
| 4.3.1 | Angle of Attack | $\alpha = 0$ to 8° |
| 4.3.2 | Mach Number | M = 0.85 to 0.90 |
| 4.3.3 | Dynamic Pressure | Approx 14,000 to 30,000 $N/m^2$ |
| 4.3.4 | Reynolds Number | $R_{\bar{c}} \approx 2.8 \times 10^6$ to $3.7 \times 10^6$ |
| 4.3.5 | Stagnation Temperature | 300 K |
| 4.4 | Transition | |
| 4.4.1 | Free or Fixed | Fixed |
| 4.4.2 | Position of Free Transition | N/A |
| 4.4.3 | Position of Fixed Transition, Width of Strips, Size and Type of Roughness | See Figure 9.3<br>Ballotini 2.54 mm wide, 0.127 to 0.152 mm diameter. Wing upper surface 0.05c (root) to 0.35c (0.745) and to 0.30c (0.895) |
| 4.4.4 | Were Checks made to Determine if Transition Occurred at Trip Locations? | Yes (acenaphthene sublimation) |
| 4.5 | Wing Bending or Torsion Under Load | |
| 4.5.1 | Describe any Aero-Elastic Measurements Made During Tests | None |
| 4.5.2 | Describe Results of Any Bench Calibrations | None |
| 4.6 | Were Different Sized Models Used in Wind-Tunnel Investigations? If so, Indicate Size | No |
| 4.7 | Areas and Lengths Used to Form Coefficients | Area: $S = 0.312\ m^2$<br>Chord: $\bar{c} = 0.279$ m |
| 4.8 | References on Tests | None |
| 4.9 | Related Reports | None |

## 5 Instrumentation

### 5.1 Surface Pressure Measurements

| | | |
|---|---|---|
| 5.1.1 | Pressure Orifices in Wing. Locations and Number on Upper and Lower Surfaces | The locations of the wing pressure orifices are listed in Table 9.3 |
| 5.1.2 | Pressure Orifices on Fuselage Location and Number | N/A |
| 5.1.3 | Pressure Orifices on Components, Give Component and Orifice Location | None |
| 5.1.4 | Geometry of Orifices | Round holes 0.6 mm diameter |
| 5.1.5 | Type of Pressure Transducer and Scanning Devices Used. Indicate Range and Accuracy | PM 131TC Transducers<br>S-type Scanivalves<br>Range ±0.8 bar, accuracy ±1 mbar |

### 5.2 Force Measurements

5.2.1 Type and Location of Balance — ARA 3" internal strain gauge balance

5.2.2 Forces and Moments that can be Measured, Maximum Loads and Calibration Accuracy for Balance of 5.2.1

| | Maximum Load | Average Absolute Error |
|---|---|---|
| Normal force | ±17,800 N | 15.0 N |
| Axial force | ± 2,200 N | 0.8 N |
| Side force | ± 4,000 N | 7.0 N |
| Pitching moment | ± 2,170 Nm | 1.2 Nm |
| Rolling moment | ± 680 Nm | 0.2 Nm |
| Yawing moment | ± 680 Nm | 1.4 Nm |

| | | |
|---|---|---|
| 5.2.3 | Forces and Moments on Components | None |
| | Type and Location of Balance | N/A |
| | Maximum Loads and Accuracy | N/A |

### 5.3 Boundary Layer and Flow-Field Measurements

| | | |
|---|---|---|
| 5.3.1 | Boundary Layer Probe Type, Position and Drive Mechanism | No |
| 5.3.2 | Probe Dimension Relative to Boundary-Layer Thickness | N/A |
| 5.3.3 | Laser-Doppler Velocimeter. Give Description of Apparatus and Accuracy | No |
| 5.3.4 | Method and/or Instrument Used to Determine Boundary-Layer Transition | Acenaphthene Sublimation Tests |
| 5.3.5 | Describe any Downstream Rakes or Probes used. Reason for Use | None |

### 5.4 Surface Flow Visualisation

5.4.1 Indicate Method Used to Determine

| | |
|---|---|
| - streamline pattern | Oil flows |
| - boundary-layer transition | Acenaphthene Sublimation |

5.4.2 Accuracy of Method — N/A

### 5.5 Skin Friction Measurements — None

| | | |
|---|---|---|
| 5.5.1 | Type of Instrument | N/A |
| 5.5.2 | Geometry and Accuracy of Instrument | N/A |
| 5.5.3 | Locations Where Probe Used | N/A |

| | |
|---|---|
| 5.6 Simulation of Exhaust Jet | No |
| 5.6.1 Describe Ducting of Air | N/A |
| 5.7 Additional Remarks | Nil |

## 6 Data

| | |
|---|---|
| **6.1 Accuracy** | |
| 6.1.1 Pressure Coefficients | $C_p = \pm 0.002$ |
| 6.1.2 Aerodynamic Coefficients | $C_L$ ±0.002, $C_D$ ±0.0002 (at low $C_L$) |
| 6.1.3 Boundary Layer and Wake Quantities | N/A |
| 6.1.4 Repeatability | Not specifically checked in this test but generally consistent with 6.1.1, 6.1.2 |
| 6.1.5 Additional Remarks | Nil |
| **6.2 Wall Interference Corrections** | |
| 6.2.1 Solid and Wake Blockage. Give Procedures and Equations | Solid, but not wake, blockage corrections have been applied. See 6.2.2 below. Internal ARA Memo |
| 6.2.2 Give Blockage Factors as Functions of Mach Number | $M = 0.85$ $\Delta M = 0$<br>$M = 0.87$ $\Delta M = -0.0003$<br>$M = 0.90$ $\Delta M = -0.0010$ |
| 6.2.3 Upwash, Streamline Curvature and Lift Interference. Give Procedure and Equation | Working section flow angle and streamline curvature effects on $C_m$ were determined by testing the model both erect and inverted. See Table 9.5 |
| 6.2.4 Give Lift Interference Parameters as Function of Mach Number | Wall constraint is allowed for by correcting incidence $\Delta\alpha° = -0.21\ C_L$ |
| 6.2.5 Reference on Wall-Interference Correction | Internal ARA Memo |
| 6.2.6 Additional Remarks | Blockage buoyancy correction given in Table 9.6 |
| **6.3 Data Presentation** | |
| 6.3.1 Aerodynamic Coefficient | $C_L$, $C_m$, $C_D$ values are given in Table 9.4 |
| 6.3.2 Surface Pressure Coefficients | Table 9.7 and Figure 9.4 |
| 6.3.3 Flow Conditions for | |
| - aerodynamic coefficient data | See Table 9.4 |
| - pressure data | See Table 9.4 |
| 6.3.4 Boundary Layer and/or Wake Data | None |
| 6.3.5 Flow Conditions for Boundary Layer and/or Wake Data | N/A |
| 6.3.6 Wall Interference Corrections Included? | Wall interference corrections have been applied to the data presented and the corrections themselves are detailed in 6.2 |
| 6.3.7 Aeroelastic Corrections Included? | No |
| 6.3.8 Other Corrections | The overall drag measurements have been corrected for the force acting on the fuselage base, ie $\Delta C_D = C_p\ (\text{Base}) \times \frac{(\text{Base area})}{\text{Ref area}} \cos\alpha$ |
| 6.3.9 Additional Remarks | Nil |
| **6.4 Were Tests Carried out in Different Facilities on the Current Model? If so, What Facilities? Are Data Included in Present Data Base?** | No |

## 7 References

1) Haines A B, Jones J C M — The centre-line Mach-number distributions and auxiliary suction requirements for the ARA 9ft x 8ft transonic wind tunnel. ARC R&M 3140, 1960

2) Hills R — Design and operational problems of the electrically driven transonic wind tunnel. Journal of the Royal Aero Society, Vol 62, page 12, 1958

## 8 List of Symbols

| | |
|---|---|
| $c$ | Local chord |
| $\bar{c}$ | Standard mean chord |
| $\bar{\bar{c}}$ | Aerodynamic mean chord |
| $C_p$ | Pressure coefficient |
| $C_D$ | Drag coefficient D/qS |
| $C_L$ | Lift coefficient L/qS |
| $C_m$ | Pitching moment coefficient $m/qS\bar{\bar{c}}$ |
| D | Drag |
| L | Lift |
| m | Pitching moment |
| M | Mach number |
| q | Dynamic pressure |
| $R_c$ | Reynolds number |
| S | Wing area |
| x | Chordwise distance from local leading edge in streamwise direction |
| y | Spanwise distance from origin of wing axis system (see Figure 9.1) |
| z | Wing ordinate normal to xy-plane |
| $\alpha$ | Angle of attack |
| $\eta$ | Ratio of spanwise distance from origin of wing axis system to semispan, ETA GROSS |

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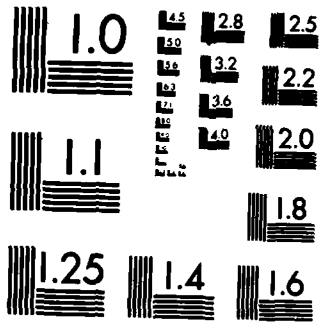
RESEARCH AND DEVELOPMENT NEUILLY.. JUL 84

UNCLASSIFIED AGARD-AR-138-ADD F/G 20/4 NL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4.5
5.0
5.6
6.3
2.8
3.2
3.6
4.0
2.5
2.2
2.0
1.1
1.8
1.25
1.4
1.6

Y=122.3980 CHORD=373.3216

UPPER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | 0.008735 |
| 0.009607 | 0.017512 |
| 0.021530 | 0.026434 |
| 0.038060 | 0.035142 |
| 0.059040 | 0.042805 |
| 0.084266 | 0.049052 |
| 0.113495 | 0.053690 |
| 0.146447 | 0.057047 |
| 0.182804 | 0.059445 |
| 0.222215 | 0.060814 |
| 0.264302 | 0.061144 |
| 0.308659 | 0.060541 |
| 0.354858 | 0.059073 |
| 0.402455 | 0.056818 |
| 0.450992 | 0.053871 |
| 0.500000 | 0.050325 |
| 0.549009 | 0.046251 |
| 0.597545 | 0.041719 |
| 0.645143 | 0.036894 |
| 0.691342 | 0.031759 |
| 0.735698 | 0.026663 |
| 0.777785 | 0.021732 |
| 0.817196 | 0.016934 |
| 0.853553 | 0.012364 |
| 0.886505 | 0.008034 |
| 0.915735 | 0.004024 |
| 0.940960 | 0.000422 |
| 0.961939 | -0.002683 |
| 0.978470 | -0.005209 |
| 0.990392 | -0.007083 |
| 0.997599 | -0.008241 |
| 1.000000 | -0.008633 |

LOWER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | -0.007084 |
| 0.009607 | -0.013284 |
| 0.021530 | -0.018119 |
| 0.038060 | -0.022108 |
| 0.059040 | -0.025542 |
| 0.084266 | -0.028538 |
| 0.113495 | -0.031106 |
| 0.146447 | -0.033317 |
| 0.182804 | -0.035166 |
| 0.222215 | -0.036554 |
| 0.264302 | -0.037380 |
| 0.308659 | -0.037472 |
| 0.354858 | -0.036826 |
| 0.402455 | -0.035334 |
| 0.450992 | -0.033011 |
| 0.500000 | -0.029936 |
| 0.549009 | -0.025973 |
| 0.597545 | -0.021149 |
| 0.645143 | -0.016820 |
| 0.691342 | -0.013195 |
| 0.735698 | -0.011004 |
| 0.777785 | -0.009919 |
| 0.817196 | -0.009736 |
| 0.853553 | -0.010003 |
| 0.886505 | -0.010311 |
| 0.915735 | -0.010692 |
| 0.940960 | -0.011167 |
| 0.961939 | -0.011675 |
| 0.978470 | -0.012169 |
| 0.990392 | -0.012573 |
| 0.997592 | -0.012863 |
| 1.000000 | -0.012935 |

Y=143.2371 CHORD=361.1481

UPPER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | 0.008533 |
| 0.009607 | 0.017113 |
| 0.021530 | 0.025857 |
| 0.038060 | 0.034424 |
| 0.059040 | 0.041986 |
| 0.084266 | 0.048174 |
| 0.113495 | 0.052781 |
| 0.146447 | 0.056135 |
| 0.182804 | 0.058553 |
| 0.222215 | 0.060004 |
| 0.264302 | 0.060502 |
| 0.308659 | 0.060152 |
| 0.354858 | 0.059013 |
| 0.402455 | 0.057143 |
| 0.450992 | 0.054616 |
| 0.500000 | 0.051505 |
| 0.549009 | 0.047858 |
| 0.597545 | 0.043724 |
| 0.645143 | 0.039214 |
| 0.691342 | 0.034510 |
| 0.735698 | 0.029800 |
| 0.777785 | 0.025156 |
| 0.817196 | 0.020568 |
| 0.853553 | 0.016101 |
| 0.886505 | 0.011820 |
| 0.915735 | 0.007847 |
| 0.940960 | 0.004282 |
| 0.961939 | 0.001216 |
| 0.978470 | -0.001272 |
| 0.990392 | -0.003112 |
| 0.997599 | -0.004246 |
| 1.000000 | -0.004629 |

LOWER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | -0.006863 |
| 0.009607 | -0.012898 |
| 0.021530 | -0.017582 |
| 0.038060 | -0.021393 |
| 0.059040 | -0.024693 |
| 0.084266 | -0.027586 |
| 0.113495 | -0.030092 |
| 0.146447 | -0.032283 |
| 0.182804 | -0.034151 |
| 0.222215 | -0.035554 |
| 0.264302 | -0.036328 |
| 0.308659 | -0.036353 |
| 0.354858 | -0.035580 |
| 0.402455 | -0.033870 |
| 0.450992 | -0.031310 |
| 0.500000 | -0.027987 |
| 0.549009 | -0.023738 |
| 0.597545 | -0.018867 |
| 0.645143 | -0.013903 |
| 0.691342 | -0.010226 |
| 0.735698 | -0.007786 |
| 0.777785 | -0.006442 |
| 0.817196 | -0.006158 |
| 0.853553 | -0.006295 |
| 0.886505 | -0.006583 |
| 0.915735 | -0.006954 |
| 0.940960 | -0.007413 |
| 0.961939 | -0.007899 |
| 0.978470 | -0.008381 |
| 0.990392 | -0.008744 |
| 0.997592 | -0.009003 |
| 1.000000 | -0.009098 |

Y=170.0014 CHORD=345.0930

UPPER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | 0.008262 |
| 0.009607 | 0.016580 |
| 0.021530 | 0.025077 |
| 0.038060 | 0.033434 |
| 0.059040 | 0.040843 |
| 0.084266 | 0.046932 |
| 0.113495 | 0.051494 |
| 0.146447 | 0.054842 |
| 0.182804 | 0.057290 |
| 0.222215 | 0.058847 |
| 0.264302 | 0.059582 |
| 0.308659 | 0.059537 |
| 0.354858 | 0.058822 |
| 0.402455 | 0.057447 |
| 0.450992 | 0.055458 |
| 0.500000 | 0.052906 |
| 0.549009 | 0.049823 |
| 0.597545 | 0.046246 |
| 0.645143 | 0.042279 |
| 0.691342 | 0.038099 |
| 0.735698 | 0.033871 |
| 0.777785 | 0.029623 |
| 0.817196 | 0.025307 |
| 0.853553 | 0.020997 |
| 0.886505 | 0.016807 |
| 0.915735 | 0.012902 |
| 0.940960 | 0.009399 |
| 0.961939 | 0.006369 |
| 0.978470 | 0.003950 |
| 0.990392 | 0.002150 |
| 0.997599 | 0.001045 |
| 1.000000 | 0.000672 |

LOWER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | -0.006692 |
| 0.009607 | -0.012411 |
| 0.021530 | -0.016973 |
| 0.038060 | -0.020532 |
| 0.059040 | -0.023664 |
| 0.084266 | -0.026480 |
| 0.113495 | -0.028891 |
| 0.146447 | -0.031058 |
| 0.182804 | -0.032949 |
| 0.222215 | -0.034367 |
| 0.264302 | -0.035102 |
| 0.308659 | -0.035017 |
| 0.354858 | -0.034037 |
| 0.402455 | -0.032094 |
| 0.450992 | -0.029230 |
| 0.500000 | -0.025546 |
| 0.549009 | -0.020958 |
| 0.597545 | -0.015532 |
| 0.645143 | -0.010411 |
| 0.691342 | -0.006371 |
| 0.735698 | -0.003555 |
| 0.777785 | -0.001985 |
| 0.817196 | -0.001465 |
| 0.853553 | -0.001455 |
| 0.886505 | -0.001599 |
| 0.915735 | -0.002027 |
| 0.940960 | -0.002453 |
| 0.961939 | -0.002905 |
| 0.978470 | -0.003392 |
| 0.990392 | -0.003685 |
| 0.997592 | -0.003920 |
| 1.000000 | -0.004003 |

Y=199.2974 CHORD=327.5316

UPPER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | 0.007992 |
| 0.009607 | 0.016047 |
| 0.021530 | 0.024290 |
| 0.038060 | 0.032421 |
| 0.059040 | 0.039683 |
| 0.084266 | 0.045649 |
| 0.113495 | 0.050166 |
| 0.146447 | 0.053510 |
| 0.182804 | 0.055998 |
| 0.222215 | 0.057657 |
| 0.264302 | 0.058606 |
| 0.308659 | 0.058932 |
| 0.354858 | 0.058681 |
| 0.402455 | 0.057652 |
| 0.450992 | 0.056457 |
| 0.500000 | 0.054527 |
| 0.549009 | 0.052082 |
| 0.597545 | 0.049157 |
| 0.645143 | 0.045838 |
| 0.691342 | 0.042274 |
| 0.735698 | 0.038600 |
| 0.777785 | 0.034800 |
| 0.817196 | 0.030797 |
| 0.853553 | 0.026673 |
| 0.886505 | 0.022599 |
| 0.915735 | 0.018764 |
| 0.940960 | 0.015356 |
| 0.961939 | 0.012413 |
| 0.978470 | 0.010030 |
| 0.990392 | 0.008274 |
| 0.997599 | 0.007198 |
| 1.000000 | 0.006835 |

LOWER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | -0.006396 |
| 0.009607 | -0.011955 |
| 0.021530 | -0.016234 |
| 0.038060 | -0.019746 |
| 0.059040 | -0.022771 |
| 0.084266 | -0.025443 |
| 0.113495 | -0.027803 |
| 0.146447 | -0.029944 |
| 0.182804 | -0.031857 |
| 0.222215 | -0.033281 |
| 0.264302 | -0.033954 |
| 0.308659 | -0.033727 |
| 0.354858 | -0.032513 |
| 0.402455 | -0.030253 |
| 0.450992 | -0.027089 |
| 0.500000 | -0.022933 |
| 0.549009 | -0.017910 |
| 0.597545 | -0.012038 |
| 0.645143 | -0.006462 |
| 0.691342 | -0.001371 |
| 0.735698 | 0.001267 |
| 0.777785 | 0.003251 |
| 0.817196 | 0.004005 |
| 0.853553 | 0.004117 |
| 0.886505 | 0.003957 |
| 0.915735 | 0.003680 |
| 0.940960 | 0.003305 |
| 0.961939 | 0.002837 |
| 0.978470 | 0.002510 |
| 0.990392 | 0.002156 |
| 0.997592 | 0.001953 |
| 1.000000 | 0.001909 |

TABLE 9.1 M86 WING GEOMETRY

Y=238.2111 CHORD=304.1972

UPPER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | 0.007708 |
| 0.009607 | 0.015488 |
| 0.021530 | 0.023440 |
| 0.038060 | 0.031272 |
| 0.059040 | 0.038284 |
| 0.084288 | 0.044121 |
| 0.113495 | 0.048572 |
| 0.146447 | 0.051898 |
| 0.182804 | 0.054388 |
| 0.222215 | 0.056162 |
| 0.264302 | 0.057358 |
| 0.308658 | 0.058085 |
| 0.354858 | 0.058339 |
| 0.402455 | 0.058141 |
| 0.450992 | 0.057443 |
| 0.500000 | 0.056252 |
| 0.549009 | 0.054605 |
| 0.597545 | 0.052555 |
| 0.645143 | 0.050141 |
| 0.691342 | 0.047419 |
| 0.735698 | 0.044453 |
| 0.777785 | 0.041208 |
| 0.817196 | 0.037811 |
| 0.853553 | 0.033767 |
| 0.886505 | 0.029858 |
| 0.915735 | 0.026245 |
| 0.940960 | 0.022948 |
| 0.961939 | 0.020101 |
| 0.978470 | 0.017791 |
| 0.990392 | 0.016066 |
| 0.997592 | 0.015044 |
| 1.000000 | 0.014692 |

LOWER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | -0.006202 |
| 0.009607 | -0.011578 |
| 0.021530 | -0.015735 |
| 0.038060 | -0.019193 |
| 0.059040 | -0.022170 |
| 0.084288 | -0.024796 |
| 0.113495 | -0.027111 |
| 0.146447 | -0.029248 |
| 0.182804 | -0.031193 |
| 0.222215 | -0.032825 |
| 0.264302 | -0.033214 |
| 0.308658 | -0.032802 |
| 0.354858 | -0.031279 |
| 0.402455 | -0.028617 |
| 0.450992 | -0.024908 |
| 0.500000 | -0.020271 |
| 0.549009 | -0.014651 |
| 0.597545 | -0.008122 |
| 0.645143 | -0.001858 |
| 0.691342 | 0.003266 |
| 0.735698 | 0.007082 |
| 0.777785 | 0.009520 |
| 0.817196 | 0.010624 |
| 0.853553 | 0.010971 |
| 0.886505 | 0.010981 |
| 0.915735 | 0.010836 |
| 0.940960 | 0.010585 |
| 0.961939 | 0.010235 |
| 0.978470 | 0.009906 |
| 0.990392 | 0.009631 |
| 0.997592 | 0.009451 |
| 1.000000 | 0.009388 |

Y=279.7753 CHORD=279.27??

UPPER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | 0.007539 |
| 0.009607 | 0.015159 |
| 0.021530 | 0.022866 |
| 0.038060 | 0.030416 |
| 0.059040 | 0.037180 |
| 0.084288 | 0.042846 |
| 0.113495 | 0.047226 |
| 0.146447 | 0.050505 |
| 0.182804 | 0.052365 |
| 0.222215 | 0.054783 |
| 0.264302 | 0.056135 |
| 0.308658 | 0.057121 |
| 0.354858 | 0.057810 |
| 0.402455 | 0.058138 |
| 0.450992 | 0.058035 |
| 0.500000 | 0.057499 |
| 0.549009 | 0.056566 |
| 0.597545 | 0.055524 |
| 0.645143 | 0.054142 |
| 0.691342 | 0.052331 |
| 0.735698 | 0.050103 |
| 0.777785 | 0.047392 |
| 0.817196 | 0.044215 |
| 0.853553 | 0.040716 |
| 0.886505 | 0.037148 |
| 0.915735 | 0.033728 |
| 0.940960 | 0.030808 |
| 0.961939 | 0.027882 |
| 0.978470 | 0.025848 |
| 0.990392 | 0.023990 |
| 0.997592 | 0.022971 |
| 1.000000 | 0.022627 |

LOWER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | -0.008193 |
| 0.009607 | -0.011581 |
| 0.021530 | -0.015790 |
| 0.038060 | -0.019420 |
| 0.059040 | -0.022542 |
| 0.084288 | -0.025264 |
| 0.113495 | -0.027812 |
| 0.146447 | -0.029781 |
| 0.182804 | -0.031777 |
| 0.222215 | -0.033207 |
| 0.264302 | -0.033699 |
| 0.308658 | -0.033063 |
| 0.354858 | -0.031225 |
| 0.402455 | -0.028120 |
| 0.450992 | -0.023893 |
| 0.500000 | -0.018877 |
| 0.549009 | -0.012373 |
| 0.597545 | -0.005041 |
| 0.645143 | 0.002099 |
| 0.691342 | 0.008022 |
| 0.735698 | 0.012420 |
| 0.777785 | 0.015323 |
| 0.817196 | 0.016821 |
| 0.853553 | 0.017498 |
| 0.886505 | 0.017790 |
| 0.915735 | 0.017872 |
| 0.940960 | 0.017788 |
| 0.961939 | 0.017551 |
| 0.978470 | 0.017234 |
| 0.990392 | 0.017082 |
| 0.997592 | 0.016905 |
| 1.000000 | 0.016849 |

Y=321.9217 CHORD=254.0002

UPPER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | 0.007463 |
| 0.009607 | 0.015015 |
| 0.021530 | 0.022605 |
| 0.038060 | 0.029912 |
| 0.059040 | 0.036480 |
| 0.084288 | 0.041996 |
| 0.113495 | 0.046284 |
| 0.146447 | 0.049484 |
| 0.182804 | 0.051874 |
| 0.222215 | 0.053859 |
| 0.264302 | 0.055029 |
| 0.308658 | 0.056116 |
| 0.354858 | 0.057010 |
| 0.402455 | 0.057653 |
| 0.450992 | 0.057973 |
| 0.500000 | 0.057980 |
| 0.549009 | 0.057773 |
| 0.597545 | 0.057396 |
| 0.645143 | 0.056772 |
| 0.691342 | 0.055701 |
| 0.735698 | 0.054096 |
| 0.777785 | 0.051967 |
| 0.817196 | 0.049413 |
| 0.853553 | 0.046520 |
| 0.886505 | 0.043517 |
| 0.915735 | 0.040594 |
| 0.940960 | 0.037871 |
| 0.961939 | 0.035453 |
| 0.978470 | 0.033450 |
| 0.990392 | 0.031951 |
| 0.997592 | 0.031025 |
| 1.000000 | 0.030712 |

LOWER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | -0.006269 |
| 0.009607 | -0.011705 |
| 0.021530 | -0.016071 |
| 0.038060 | -0.019924 |
| 0.059040 | -0.023242 |
| 0.084288 | -0.026118 |
| 0.113495 | -0.028564 |
| 0.146447 | -0.030802 |
| 0.182804 | -0.032668 |
| 0.222215 | -0.034331 |
| 0.264302 | -0.034805 |
| 0.308658 | -0.034066 |
| 0.354858 | -0.032028 |
| 0.402455 | -0.028605 |
| 0.450992 | -0.023949 |
| 0.500000 | -0.018188 |
| 0.549009 | -0.011269 |
| 0.597545 | -0.003304 |
| 0.645143 | 0.004458 |
| 0.691342 | 0.010984 |
| 0.735698 | 0.015902 |
| 0.777785 | 0.019350 |
| 0.817196 | 0.021443 |
| 0.853553 | 0.022726 |
| 0.886505 | 0.023590 |
| 0.915735 | 0.024182 |
| 0.940960 | 0.024455 |
| 0.961939 | 0.024547 |
| 0.978470 | 0.024521 |
| 0.990392 | 0.024447 |
| 0.997592 | 0.024384 |
| 1.000000 | 0.024358 |

Y=364.0533 CHORD=228.7120

UPPER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | 0.007398 |
| 0.009607 | 0.014891 |
| 0.021530 | 0.022386 |
| 0.038060 | 0.029481 |
| 0.059040 | 0.035874 |
| 0.084288 | 0.041248 |
| 0.113495 | 0.045443 |
| 0.146447 | 0.048580 |
| 0.182804 | 0.050879 |
| 0.222215 | 0.052627 |
| 0.264302 | 0.053990 |
| 0.308658 | 0.055158 |
| 0.354858 | 0.056214 |
| 0.402455 | 0.057138 |
| 0.450992 | 0.057883 |
| 0.500000 | 0.058443 |
| 0.549009 | 0.058843 |
| 0.597545 | 0.059080 |
| 0.645143 | 0.058996 |
| 0.691342 | 0.058485 |
| 0.735698 | 0.057454 |
| 0.777785 | 0.055952 |
| 0.817196 | 0.054047 |
| 0.853553 | 0.051880 |
| 0.886505 | 0.049535 |
| 0.915735 | 0.047197 |
| 0.940960 | 0.044981 |
| 0.961939 | 0.042936 |
| 0.978470 | 0.041238 |
| 0.990392 | 0.039932 |
| 0.997592 | 0.039154 |
| 1.000000 | 0.038882 |

LOWER SURFACE

| X/C | Z/C |
|---|---|
| 0.000000 | 0.000000 |
| 0.002408 | -0.008336 |
| 0.009607 | -0.011829 |
| 0.021530 | -0.016310 |
| 0.038060 | -0.020385 |
| 0.059040 | -0.023848 |
| 0.084288 | -0.026884 |
| 0.113495 | -0.029385 |
| 0.146447 | -0.031743 |
| 0.182804 | -0.033683 |
| 0.222215 | -0.035363 |
| 0.264302 | -0.035844 |
| 0.308658 | -0.035046 |
| 0.354858 | -0.032822 |
| 0.402455 | -0.029120 |
| 0.450992 | -0.024045 |
| 0.500000 | -0.017739 |
| 0.549009 | -0.010245 |
| 0.597545 | -0.001610 |
| 0.645143 | 0.006946 |
| 0.691342 | 0.013246 |
| 0.735698 | 0.018632 |
| 0.777785 | 0.022222 |
| 0.817196 | 0.025375 |
| 0.853553 | 0.027363 |
| 0.886505 | 0.028904 |
| 0.915735 | 0.030063 |
| 0.940960 | 0.030842 |
| 0.961939 | 0.031327 |
| 0.978470 | 0.031603 |
| 0.990392 | 0.031745 |
| 0.997592 | 0.031809 |
| 1.000000 | 0.031823 |

TABLE 9.1 (contd) M86 WING GEOMETRY

**UPPER SURFACE**

| Y=405.1558 | CHORD=204.0650 | Y=443.1194 | CHORD=181.3242 | Y=475.8424 | CHORD=161.8218 | Y=502.1951 | CHORD=145.8895 | Y=543.4130 | CHORD=121.1699 |
|---|---|---|---|---|---|---|---|---|---|
| X/C | Z/C | X/C | Z/C | X/C | Z/C | X/C | Z/C | X/C | Z/C |
| 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 0.002408 | 0.007391 | 0.002408 | 0.007401 | 0.002408 | 0.007409 | 0.002408 | 0.007409 | 0.002408 | 0.007409 |
| 0.009607 | 0.014836 | 0.009607 | 0.014936 | 0.009607 | 0.014968 | 0.009607 | 0.014973 | 0.009607 | 0.014983 |
| 0.021530 | 0.022381 | 0.021530 | 0.022473 | 0.021530 | 0.022546 | 0.021530 | 0.022572 | 0.021530 | 0.022628 |
| 0.038060 | 0.029510 | 0.038060 | 0.029671 | 0.038060 | 0.029814 | 0.038060 | 0.029895 | 0.038060 | 0.030063 |
| 0.059040 | 0.035904 | 0.059040 | 0.036139 | 0.059040 | 0.036387 | 0.059040 | 0.036581 | 0.059040 | 0.036982 |
| 0.084266 | 0.041288 | 0.084266 | 0.041810 | 0.084266 | 0.042029 | 0.084266 | 0.042419 | 0.084266 | 0.043228 |
| 0.113495 | 0.045446 | 0.113495 | 0.046345 | 0.113495 | 0.046821 | 0.113495 | 0.047314 | 0.113495 | 0.048751 |
| 0.146447 | 0.048553 | 0.146447 | 0.049940 | 0.146447 | 0.050259 | 0.146447 | 0.051381 | 0.146447 | 0.053707 |
| 0.182804 | 0.050881 | 0.182804 | 0.051801 | 0.182804 | 0.053250 | 0.182804 | 0.054928 | 0.182804 | 0.058409 |
| 0.222215 | 0.052867 | 0.222215 | 0.053901 | 0.222215 | 0.055888 | 0.222215 | 0.058239 | 0.222215 | 0.063113 |
| 0.264302 | 0.054088 | 0.264302 | 0.055780 | 0.264302 | 0.058439 | 0.264302 | 0.061538 | 0.264302 | 0.067965 |
| 0.308659 | 0.055389 | 0.308659 | 0.057642 | 0.308659 | 0.061035 | 0.308659 | 0.064904 | 0.308659 | 0.072928 |
| 0.354858 | 0.056826 | 0.354858 | 0.059513 | 0.354858 | 0.063659 | 0.354858 | 0.068243 | 0.354858 | 0.077751 |
| 0.402455 | 0.057822 | 0.402455 | 0.061350 | 0.402455 | 0.066173 | 0.402455 | 0.071343 | 0.402455 | 0.082064 |
| 0.450992 | 0.058951 | 0.450992 | 0.063013 | 0.450992 | 0.068324 | 0.450992 | 0.073878 | 0.450992 | 0.085396 |
| 0.500000 | 0.059958 | 0.500000 | 0.064271 | 0.500000 | 0.069748 | 0.500000 | 0.075435 | 0.500000 | 0.087230 |
| 0.549009 | 0.060674 | 0.549009 | 0.065032 | 0.549009 | 0.070477 | 0.549009 | 0.076139 | 0.549009 | 0.087882 |
| 0.597545 | 0.060900 | 0.597545 | 0.065177 | 0.597545 | 0.070531 | 0.597545 | 0.076120 | 0.597545 | 0.087712 |
| 0.645143 | 0.060647 | 0.645143 | 0.064749 | 0.645143 | 0.069958 | 0.645143 | 0.075432 | 0.645143 | 0.086783 |
| 0.691342 | 0.060020 | 0.691342 | 0.063923 | 0.691342 | 0.068940 | 0.691342 | 0.074261 | 0.691342 | 0.085297 |
| 0.735698 | 0.059080 | 0.735698 | 0.062799 | 0.735698 | 0.067591 | 0.735698 | 0.072732 | 0.735698 | 0.083394 |
| 0.777785 | 0.057855 | 0.777785 | 0.061413 | 0.777785 | 0.065955 | 0.777785 | 0.070897 | 0.777785 | 0.081145 |
| 0.817196 | 0.056380 | 0.817196 | 0.059777 | 0.817196 | 0.064059 | 0.817196 | 0.068794 | 0.817196 | 0.078814 |
| 0.853553 | 0.054640 | 0.853553 | 0.057931 | 0.853553 | 0.061953 | 0.853553 | 0.066480 | 0.853553 | 0.075871 |
| 0.886505 | 0.052770 | 0.886505 | 0.055942 | 0.886505 | 0.059715 | 0.886505 | 0.064045 | 0.886505 | 0.073025 |
| 0.915735 | 0.050836 | 0.915735 | 0.053894 | 0.915735 | 0.057439 | 0.915735 | 0.061587 | 0.915735 | 0.070169 |
| 0.940960 | 0.048959 | 0.940960 | 0.051917 | 0.940960 | 0.055259 | 0.940960 | 0.059248 | 0.940960 | 0.067513 |
| 0.961939 | 0.047258 | 0.961939 | 0.050136 | 0.961939 | 0.053309 | 0.961939 | 0.057159 | 0.961939 | 0.065144 |
| 0.978470 | 0.045834 | 0.978470 | 0.048855 | 0.978470 | 0.051653 | 0.978470 | 0.055437 | 0.978470 | 0.063201 |
| 0.990392 | 0.044761 | 0.990392 | 0.047542 | 0.990392 | 0.050482 | 0.990392 | 0.054147 | 0.990392 | 0.061749 |
| 0.997599 | 0.044096 | 0.997599 | 0.046854 | 0.997599 | 0.049734 | 0.997599 | 0.053353 | 0.997599 | 0.060857 |
| 1.000000 | 0.043863 | 1.000000 | 0.046619 | 1.000000 | 0.049479 | 1.000000 | 0.053081 | 1.000000 | 0.060552 |

**LOWER SURFACE**

| Y=405.1558 | CHORD=204.0650 | Y=443.1194 | CHORD=181.3242 | Y=475.8424 | CHORD=161.8218 | Y=502.1951 | CHORD=145.8895 | Y=543.4130 | CHORD=121.1699 |
|---|---|---|---|---|---|---|---|---|---|
| 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 0.002408 | -0.006341 | 0.002408 | -0.006331 | 0.002408 | -0.006323 | 0.002408 | -0.006323 | 0.002408 | -0.006323 |
| 0.009607 | -0.011825 | 0.009607 | -0.011782 | 0.009607 | -0.011752 | 0.009607 | -0.011747 | 0.009607 | -0.011737 |
| 0.021530 | -0.016295 | 0.021530 | -0.016203 | 0.021530 | -0.016130 | 0.021530 | -0.016104 | 0.021530 | -0.016050 |
| 0.038060 | -0.020326 | 0.038060 | -0.020165 | 0.038060 | -0.020022 | 0.038060 | -0.019941 | 0.038060 | -0.019773 |
| 0.059040 | -0.023818 | 0.059040 | -0.023583 | 0.059040 | -0.023336 | 0.059040 | -0.023141 | 0.059040 | -0.022740 |
| 0.084266 | -0.026844 | 0.084266 | -0.026502 | 0.084266 | -0.026083 | 0.084266 | -0.025693 | 0.084266 | -0.024886 |
| 0.113495 | -0.029390 | 0.113495 | -0.028893 | 0.113495 | -0.028217 | 0.113495 | -0.027524 | 0.113495 | -0.026087 |
| 0.146447 | -0.031733 | 0.146447 | -0.031046 | 0.146447 | -0.030027 | 0.146447 | -0.028905 | 0.146447 | -0.026579 |
| 0.182804 | -0.033661 | 0.182804 | -0.032941 | 0.182804 | -0.031492 | 0.182804 | -0.029614 | 0.182804 | -0.026333 |
| 0.222215 | -0.035323 | 0.222215 | -0.034089 | 0.222215 | -0.032102 | 0.222215 | -0.029751 | 0.222215 | -0.024877 |
| 0.264302 | -0.035748 | 0.264302 | -0.034054 | 0.264302 | -0.031395 | 0.264302 | -0.028296 | 0.264302 | -0.021869 |
| 0.308659 | -0.034815 | 0.308659 | -0.032582 | 0.308659 | -0.029169 | 0.308659 | -0.025300 | 0.308659 | -0.017278 |
| 0.354858 | -0.032410 | 0.354858 | -0.029523 | 0.354858 | -0.025377 | 0.354858 | -0.020793 | 0.354858 | -0.011285 |
| 0.402455 | -0.028436 | 0.402455 | -0.024908 | 0.402455 | -0.020085 | 0.402455 | -0.014915 | 0.402455 | -0.004194 |
| 0.450992 | -0.022977 | 0.450992 | -0.018915 | 0.450992 | -0.013804 | 0.450992 | -0.008050 | 0.450992 | -0.003468 |
| 0.500000 | -0.016218 | 0.500000 | -0.011905 | 0.500000 | -0.006428 | 0.500000 | -0.000741 | 0.500000 | 0.011054 |
| 0.549009 | -0.008468 | 0.549009 | -0.004179 | 0.549009 | 0.001201 | 0.549009 | 0.006793 | 0.549009 | 0.018391 |
| 0.597545 | -0.000175 | 0.597545 | 0.003885 | 0.597545 | 0.008962 | 0.597545 | 0.014291 | 0.597545 | 0.025342 |
| 0.645143 | 0.007592 | 0.645143 | 0.011223 | 0.645143 | 0.015922 | 0.645143 | 0.020878 | 0.645143 | 0.031156 |
| 0.691342 | 0.014177 | 0.691342 | 0.017375 | 0.691342 | 0.021630 | 0.691342 | 0.026177 | 0.691342 | 0.035808 |
| 0.735698 | 0.019498 | 0.735698 | 0.022332 | 0.735698 | 0.026166 | 0.735698 | 0.030336 | 0.735698 | 0.038983 |
| 0.777785 | 0.023663 | 0.777785 | 0.026261 | 0.777785 | 0.029742 | 0.777785 | 0.033608 | 0.777785 | 0.041625 |
| 0.817196 | 0.026833 | 0.817196 | 0.029257 | 0.817196 | 0.032484 | 0.817196 | 0.036109 | 0.817196 | 0.043686 |
| 0.853553 | 0.029290 | 0.853553 | 0.031587 | 0.853553 | 0.034534 | 0.853553 | 0.037971 | 0.853553 | 0.045099 |
| 0.886505 | 0.031286 | 0.886505 | 0.033464 | 0.886505 | 0.036163 | 0.886505 | 0.039402 | 0.886505 | 0.046119 |
| 0.915735 | 0.032848 | 0.915735 | 0.034913 | 0.915735 | 0.037383 | 0.915735 | 0.040440 | 0.915735 | 0.046779 |
| 0.940960 | 0.033966 | 0.940960 | 0.035951 | 0.940960 | 0.038219 | 0.940960 | 0.041114 | 0.940960 | 0.047119 |
| 0.961939 | 0.034796 | 0.961939 | 0.036681 | 0.961939 | 0.038778 | 0.961939 | 0.041538 | 0.961939 | 0.047260 |
| 0.978470 | 0.035346 | 0.978470 | 0.037175 | 0.978470 | 0.039138 | 0.978470 | 0.041792 | 0.978470 | 0.047294 |
| 0.990392 | 0.035701 | 0.990392 | 0.037488 | 0.990392 | 0.039353 | 0.990392 | 0.041926 | 0.990392 | 0.047267 |
| 0.997592 | 0.035898 | 0.997592 | 0.037682 | 0.997592 | 0.039468 | 0.997592 | 0.041995 | 0.997592 | 0.047237 |
| 1.000000 | 0.035958 | 1.000000 | 0.037715 | 1.000000 | 0.039501 | 1.000000 | 0.042012 | 1.000000 | 0.047220 |

TABLE 9.1 (contd) M86 WING GEOMETRY

| Xm | Rm | $Am^2$ |
|---|---|---|
| 0 | 0 | 0 |
| 0.0508 | 0.0249 | 0.00195 |
| 0.1016 | 0.0462 | 0.00671 |
| 0.1524 | 0.0642 | 0.01593 |
| 0.2032 | 0.0791 | 0.02448 |
| 0.2540 | 0.0913 | 0.03276 |
| 0.3048 | 0.1009 | 0.04019 |
| 0.3556 | 0.1084 | 0.04644 |
| 0.4064 | 0.1139 | 0.05138 |
| 0.4572 | 0.1179 | 0.05502 |
| 0.508 | 0.1204 | 0.05748 |
| 0.5588 | 0.1219 | 0.05894 |
| 0.6096 | 0.1227 | 0.05965 |
| 0.6604 | 0.1229 | 0.05988 |
| 0.6985 | 0.1229 | 0.05990 |
| 0.9159 | 0.1229 | 0.05990 |
| ↓ | 0.1229 | ↓ |
| 0.9906 | 0.1229 | 0.06426 |
| 1.016 | 0.1229 | 0.06601 |
| 1.0668 | 0.1229 | 0.06950 |
| 1.1176 | 0.1229 | 0.07172 |
| 1.1684 | 0.1229 | 0.07224 |
| 1.2192 | 0.1229 | 0.07152 |
| 1.27 | 0.1229 | 0.06700 |
| 1.3209 | 0.1229 | 0.06197 |
| ↓ | 0.1229 | ↓ |
| 1.4986 | 0.1229 | 0.05990 |
| 1.5494 | 0.1223 | 0.05931 |
| 1.6002 | 0.1205 | 0.05754 |
| 1.651 | 0.1175 | 0.05466 |
| 1.7018 | 0.1133 | 0.05075 |
| 1.7526 | 0.1078 | 0.04594 |
| 1.8034 | 0.1011 | 0.04037 |
| 1.8542 | 0.0933 | 0.03425 |
| 1.9050 | 0.0842 | 0.02781 |
| 1.9558 | 0.0739 | 0.02130 |
| 2.0020 | 0.0635 | 0.01558 |

x = Distance from nose

A = Cross sectional area including wing

R = Body half width

TABLE 9.2 M86 CROSS SECTIONAL AREA DEVELOPMENT

## Wing Upper Surface

24 pressure tappings were installed on the upper surface at each of the 7 spanwise pressure measuring stations. These tappings were located at:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| x/c = | 0.010 | 0.025 | 0.040 | 0.060 | 0.080 | 0.100 | 0.120 |
| | 0.150 | 0.200 | 0.250 | 0.300 | 0.350 | 0.400 | 0.450 |
| | 0.500 | 0.550 | 0.600 | 0.650 | 0.700 | 0.750 | 0.825 |
| | 0.900 | 0.940 | 0.980 | | | | |

## Wing Lower Surface

The pressure tappings on the lower surface at each of the 7 spanwise measuring stations varied in number, they were located at:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Station No | 3-7 | 3-7 | 4,6,7 | 3-7 | 1-7 | 1-7 | 6,7 |
| x/c | 0 | 0.025 | 0.05 | 0.075 | 0.100 | 0.150 | 0.200 |
| Station No | 1-7 | 2,6,7 | 2,4-7 | 1-7 | 2,4-6 | 2,4-6 | 1-4,7 |
| x/c | 0.250 | 0.300 | 0.350 | 0.400 | 0.450 | 0.500 | 0.550 |
| Station No | 2,5,6 | 1-4,6-7 | 5,6 | 1-4,6-7 | 6 | 1-7 | 1-7 |
| x/c | 0.600 | 0.700 | 0.780 | 0.860 | 0.940 | 0.980 | 1.000 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Station No | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Station ETA | 0.24 | 0.40 | 0.52 | 0.64 | 0.74 | 0.83 | 0.89 |
| No of tappings | 9 | 14 | 12 | 16 | 14 | 20 | 16 |

## Unserviceable Pressure Ports

The following pressure ports were unserviceable for these tests:

| | | |
|---|---|---|
| Upper Surface | ETA = 0.74 | x/c = 0.65 |
| | ETA = 0.83 | x/c = 0.20 |
| Lower Surface | ETA = 0.83 | x/c = 0 |

| | |
|---|---|
| Total number of upper surface ports | 168 |
| Total number of lower surface ports | 101 |
| | 269 |
| Total number of unserviceable ports | 10 |
| | 259 |

TABLE 9.3 LOCATION OF M86 WING STATIC PRESSURE PORTS

| Mach Number | $\alpha°$ | $C_L$ | $C_D$ | $C_m$ | Transition * Band |
|---|---|---|---|---|---|
| 0.850 | 4.203 | 0.364 | 0.03677 | 0.0603 | AFT |
| 0.851 | 5.263 | 0.460 | 0.04605 | 0.0847 | |
| 0.870 | 4.719 | 0.426 | 0.04273 | 0.0681 | |
| 0.869 | 5.007 | 0.454 | 0.04562 | 0.0734 | |
| 0.870 | 5.271 | 0.480 | 0.04852 | 0.0778 | |
| 0.900 | 4.181 | 0.404 | 0.04182 | 0.0401 | |
| 0.900 | 5.266 | 0.516 | 0.05547 | 0.0510 | |

*see Figure 9.4

TABLE 9.4 SUMMARY OF TEST CONDITIONS

| M | 0.50 | 0.70 | 0.80 | 0.90 | 0.95 |
|---|---|---|---|---|---|
| $\Delta\alpha°$ | 0.169 | 0.145 | 0.132 | 0.095 | 0.056 |
| $\Delta C_m$ | 0 | 0 | 0 | 0 | 0 |

TABLE 9.5 INCIDENCE AND $C_m$ CORRECTIONS

| M | 0.50 | 0.60 | 0.70 | 0.80 | 0.85 | 0.90 | 0.95 | 1.0 |
|---|---|---|---|---|---|---|---|---|
| $\Delta C_D$ | 0 | -0.0001 | -0.0002 | -0.0002 | -0.0003 | -0.0005 | -0.0010 | -0.0010 |

TABLE 9.6 BLOCKAGE BUOYANCY CORRECTIONS

MACH=0.850 ALPHA=4.20 CL=0.384 UPPER SURFACE CP VALUES.

| X/C \ ETA GROSS= | 0.240 | 0.400 | 0.520 | 0.640 | 0.740 | 0.830 | 0.890 |
|---|---|---|---|---|---|---|---|
| 0.000 | | | 0.5018 | 0.4704 | 0.4627 | | 0.3673 |
| 0.010 | 0.1594 | -0.1131 | -0.1504 | -0.2143 | -0.2044 | -0.1694 | -0.0735 |
| 0.025 | -0.0880 | -0.3613 | -0.4584 | -0.5555 | -0.5666 | -0.4560 | -0.4722 |
| 0.040 | -0.2290 | -0.5554 | -0.6584 | -0.7007 | -0.7106 | -0.6750 | -0.6632 |
| 0.060 | -0.3632 | -0.7700 | -0.8164 | -0.8891 | -0.8535 | -0.8611 | -0.8214 |
| 0.080 | -0.4655 | -0.9166 | -0.9217 | -0.9971 | -0.9639 | -0.9654 | -0.8851 |
| 0.100 | -0.5060 | -0.9916 | -0.9661 | -1.0059 | -1.0197 | -1.0119 | -0.9274 |
| 0.120 | -0.4655 | -0.9555 | -1.0048 | -1.0440 | -1.0513 | -1.0270 | -0.9845 |
| 0.150 | -0.6135 | -0.9255 | -1.0442 | -1.0587 | -1.0636 | -0.9635 | -0.8666 |
| 0.200 | -0.4900 | -0.7401 | -1.0391 | -1.0336 | -0.9986 | | -0.6659 |
| 0.250 | -0.4740 | -0.6300 | -0.8468 | -0.9732 | -0.9716 | -0.7879 | -0.3376 |
| 0.300 | -0.4430 | -0.5748 | -0.5951 | -0.7211 | -0.3572 | -0.2661 | -0.2601 |
| 0.350 | -0.2674 | -0.5408 | -0.4766 | -0.2527 | -0.2036 | -0.2161 | -0.2531 |
| 0.400 | -0.3724 | -0.4500 | -0.3763 | -0.2327 | -0.1990 | -0.2253 | -0.2344 |
| 0.450 | -0.3635 | -0.4041 | -0.3577 | -0.2417 | -0.2269 | -0.2346 | -0.2620 |
| 0.500 | -0.3558 | -0.3559 | -0.3162 | -0.2491 | -0.2606 | -0.3272 | -0.3566 |
| 0.550 | -0.3412 | -0.3355 | -0.3025 | -0.2636 | -0.3033 | -0.3533 | -0.3364 |
| 0.600 | -0.3104 | -0.3056 | -0.2954 | -0.2924 | -0.3286 | | -0.3345 |
| 0.650 | -0.2763 | -0.2615 | -0.3106 | -0.3226 | -0.3264 | -0.3152 | -0.3103 |
| 0.700 | -0.2368 | -0.2566 | -0.3221 | -0.3272 | -0.2793 | -0.2661 | -0.2636 |
| 0.750 | -0.2147 | -0.2551 | -0.3165 | -0.3013 | -0.2474 | -0.2332 | -0.2380 |
| 0.825 | -0.1624 | -0.2002 | -0.2366 | -0.2236 | -0.1916 | -0.1666 | -0.1654 |
| 0.900 | -0.1159 | -0.0910 | -0.1157 | -0.1961 | -0.1220 | -0.1079 | -0.1139 |
| 0.940 | -0.0610 | -0.0556 | -0.0477 | -0.0700 | -0.0587 | -0.0465 | -0.0563 |
| 0.980 | -0.0067 | 0.0224 | 0.0219 | -0.0003 | 0.0069 | 0.0133 | 0.0030 |
| 1.000 | 0.0066 | 0.0553 | 0.0703 | 0.0591 | 0.0687 | 0.0665 | 0.0575 |

MACH=0.850 ALPHA=4.20 CL=0.384 LOWER SURFACE CP VALUES.

| X/C \ ETA GROSS= | 0.240 | 0.400 | 0.520 | 0.640 | 0.740 | 0.830 | 0.890 |
|---|---|---|---|---|---|---|---|
| 0.000 | | | 0.5018 | 0.4704 | 0.4627 | | 0.3673 |
| 0.025 | | | 0.1768 | 0.1654 | 0.1349 | 0.0890 | 0.0211 |
| 0.050 | | | | 0.0370 | | -0.0441 | -0.1440 |
| 0.075 | | | 0.0222 | -0.0260 | -0.0481 | -0.1013 | -0.2121 |
| 0.100 | 0.1781 | 0.0575 | -0.0028 | -0.0410 | -0.0705 | -0.1421 | -0.2480 |
| 0.150 | 0.1282 | -0.0058 | -0.0610 | -0.0963 | -0.1328 | -0.1921 | -0.2641 |
| 0.200 | | | | | | -0.2808 | -0.3553 |
| 0.250 | 0.0052 | -0.1382 | -0.1566 | -0.2366 | -0.2807 | -0.3700 | -0.3696 |
| 0.300 | | -0.1818 | | | | -0.3662 | -0.3263 |
| 0.350 | | -0.2019 | | -0.2653 | -0.3373 | -0.3421 | -0.2784 |
| 0.400 | -0.1257 | -0.2040 | -0.2236 | -0.2653 | -0.2533 | -0.2556 | -0.1754 |
| 0.450 | | -0.1798 | | -0.2163 | -0.2116 | -0.1582 | |
| 0.500 | | -0.1343 | | -0.1457 | -0.1248 | -0.0706 | |
| 0.550 | -0.1203 | -0.0618 | -0.0696 | -0.0616 | | | 0.0298 |
| 0.600 | | 0.0298 | | | 0.0487 | 0.0783 | |
| 0.700 | 0.1102 | 0.1536 | 0.1566 | 0.1537 | | 0.1527 | 0.1508 |
| 0.780 | | | | | 0.1608 | 0.1568 | |
| 0.860 | 0.1474 | 0.1662 | 0.1774 | 0.1645 | | 0.1456 | 0.1407 |
| 0.940 | | | | | | 0.1177 | |
| 0.980 | 0.1133 | 0.0980 | 0.1260 | 0.1236 | 0.0963 | 0.0974 | 0.0684 |
| 1.000 | 0.0066 | 0.0553 | 0.0703 | 0.0591 | 0.0687 | 0.0665 | 0.0575 |

MACH=0.851 ALPHA=5.26 CL=0.460 UPPER SURFACE CP VALUES.

| X/C \ ETA GROSS= | 0.240 | 0.400 | 0.520 | 0.640 | 0.740 | 0.830 | 0.890 |
|---|---|---|---|---|---|---|---|
| 0.000 | | | 0.4322 | 0.3675 | 0.3781 | | 0.3381 |
| 0.010 | 0.0603 | -0.2369 | -0.3275 | -0.3611 | -0.3596 | -0.3247 | -0.2322 |
| 0.025 | -0.1636 | -0.5072 | -0.6053 | -0.6556 | -0.7173 | -0.5969 | -0.6164 |
| 0.040 | -0.3063 | -0.6367 | -0.7407 | -0.8095 | -0.8187 | -0.7991 | -0.8004 |
| 0.060 | -0.5367 | -0.8230 | -0.9196 | -0.9670 | -0.9920 | -0.9713 | -0.9461 |
| 0.080 | -0.5587 | -0.9942 | -1.0273 | -1.0565 | -1.0750 | -1.0660 | -0.9947 |
| 0.100 | -0.5525 | -1.0623 | -1.1017 | -1.1055 | -1.1326 | -1.1224 | -1.0446 |
| 0.120 | -0.5532 | -1.1030 | -1.1172 | -1.1536 | -1.1634 | -1.1427 | -1.1063 |
| 0.150 | -0.5593 | -1.0594 | -1.1236 | -1.1650 | -1.1773 | -1.1533 | -1.1299 |
| 0.200 | -0.5496 | -0.9204 | -1.1650 | -1.1766 | -1.1545 | | -1.0674 |
| 0.250 | -0.5075 | -0.7275 | -1.1309 | -1.1473 | -1.1362 | -1.0792 | -1.0133 |
| 0.300 | -0.5139 | -0.6477 | -0.8103 | -1.0828 | -1.0656 | -1.0463 | -0.9262 |
| 0.350 | -0.5733 | -0.6336 | -0.8317 | -1.0211 | -0.9767 | -0.8016 | -0.4413 |
| 0.400 | -0.6501 | -0.6206 | -0.6116 | -0.4662 | -0.4719 | -0.3823 | -0.2103 |
| 0.450 | -0.5404 | -0.5529 | -0.4119 | -0.2155 | -0.1927 | -0.1929 | -0.1648 |
| 0.500 | -0.4593 | -0.4261 | -0.3052 | -0.1634 | -0.1535 | -0.1666 | -0.2459 |
| 0.550 | -0.4041 | -0.3486 | -0.2765 | -0.2030 | -0.1694 | -0.1968 | -0.2949 |
| 0.600 | -0.3532 | -0.3066 | -0.2716 | -0.2291 | -0.2147 | | -0.3117 |
| 0.650 | -0.2990 | -0.2767 | -0.2796 | -0.2572 | -0.2281 | -0.2409 | -0.2901 |
| 0.700 | -0.2517 | -0.2547 | -0.2664 | -0.2694 | -0.2161 | -0.2262 | -0.2615 |
| 0.750 | -0.2164 | -0.2365 | -0.2650 | -0.2531 | -0.2063 | -0.2066 | -0.2331 |
| 0.825 | -0.1733 | -0.1772 | -0.2125 | -0.2071 | -0.1706 | -0.1763 | -0.1659 |
| 0.900 | -0.1070 | -0.0744 | -0.1019 | -0.1274 | -0.1124 | -0.1054 | -0.1236 |
| 0.940 | -0.0536 | -0.0160 | -0.0365 | -0.0661 | -0.0511 | -0.0495 | -0.0670 |
| 0.980 | -0.0009 | 0.0320 | 0.0261 | -0.0022 | 0.0108 | 0.0141 | -0.0085 |
| 1.000 | 0.0175 | 0.0545 | 0.0734 | 0.0559 | 0.0654 | 0.0578 | 0.0452 |

MACH=0.851 ALPHA=5.26 CL=0.460 LOWER SURFACE CP VALUES.

| X/C \ ETA GROSS= | 0.240 | 0.400 | 0.520 | 0.640 | 0.740 | 0.830 | 0.890 |
|---|---|---|---|---|---|---|---|
| 0.000 | | | 0.4322 | 0.3675 | 0.3781 | | 0.3381 |
| 0.025 | | | 0.2612 | 0.2705 | 0.2353 | 0.2059 | 0.1492 |
| 0.050 | | | | 0.1436 | | 0.0692 | -0.0280 |
| 0.075 | | | 0.1121 | 0.0647 | 0.0477 | 0.0011 | -0.1090 |
| 0.100 | 0.2366 | 0.1642 | 0.0762 | 0.0320 | 0.0031 | -0.0462 | -0.1574 |
| 0.150 | 0.1648 | 0.0600 | 0.0066 | -0.0266 | -0.0636 | -0.1191 | -0.2133 |
| 0.200 | | | | | | -0.2056 | -0.2505 |
| 0.250 | 0.0600 | -0.0755 | -0.1275 | -0.1744 | -0.2067 | -0.2637 | -0.3176 |
| 0.300 | | -0.1211 | | | | -0.3025 | -0.2343 |
| 0.350 | | -0.1440 | | -0.2301 | -0.2745 | -0.2564 | -0.2246 |
| 0.400 | -0.0762 | -0.1607 | -0.1766 | -0.2161 | -0.2477 | -0.2270 | -0.1621 |
| 0.450 | | -0.1354 | | -0.1760 | -0.1606 | -0.1405 | |
| 0.500 | | -0.0866 | | -0.1214 | -0.1041 | -0.0600 | |
| 0.550 | -0.0787 | -0.0336 | -0.0416 | -0.0431 | | | 0.0369 |
| 0.600 | | 0.0617 | | | 0.0607 | 0.0660 | |
| 0.700 | 0.1336 | 0.1704 | 0.1725 | 0.1660 | | 0.1666 | 0.1530 |
| 0.780 | | | | | 0.1657 | 0.1596 | |
| 0.860 | 0.1610 | 0.1790 | 0.1681 | 0.1713 | | 0.1463 | 0.1407 |
| 0.940 | | | | | | 0.1155 | |
| 0.980 | 0.1192 | 0.1097 | 0.1315 | 0.1221 | 0.0966 | 0.0236 | 0.0538 |
| 1.000 | 0.0175 | 0.0545 | 0.0734 | 0.0559 | 0.0654 | 0.0576 | 0.0452 |

TABLE 9.7 M86 WING PRESSURE DISTRIBUTIONS

MACH=0.870 ALPHA=4.72 CL=0.428 UPPER SURFACE CP VALUES.

| X/C (ETA GROSS=) | 0.240 | 0.400 | 0.520 | 0.640 | 0.740 | 0.830 | 0.890 |
|---|---|---|---|---|---|---|---|
| 0.000 | | | 0.4871 | 0.4581 | 0.4860 | | 0.2998 |
| 0.010 | -0.1439 | -0.1439 | -0.2133 | [illegible] | [illegible] | -0.1934 | -0.1088 |
| 0.025 | [illegible] | -0.4163 | -0.4881 | [illegible] | [illegible] | -0.4787 | -0.6141 |
| 0.040 | [illegible] | -0.5306 | -0.6573 | -0.7027 | -0.7065 | -0.6805 | -0.6765 |
| 0.060 | -0.4637 | -0.7622 | -0.8162 | -0.8619 | -0.8880 | -0.8590 | -0.8327 |
| 0.080 | -0.4862 | -0.8050 | [illegible] | -0.9536 | -0.9887 | -0.9833 | -0.8828 |
| 0.100 | -0.5116 | [illegible] | -0.9950 | -1.0061 | -1.0220 | -1.0133 | -0.9364 |
| 0.120 | -0.4908 | -0.8790 | -1.0065 | -1.0457 | -1.0539 | -1.0363 | -0.9977 |
| 0.150 | -0.5043 | -0.8420 | [illegible] | -1.0577 | -1.0710 | -1.0415 | -1.0232 |
| 0.200 | [illegible] | [illegible] | -1.0790 | -1.0773 | -1.0952 | | -1.0230 |
| 0.250 | -0.4768 | [illegible] | -1.0139 | -1.0523 | -1.0684 | -1.0254 | -0.9818 |
| 0.300 | -0.4612 | -0.8060 | -0.9733 | -1.0037 | -1.0117 | [illegible] | [illegible] |
| 0.350 | -0.5490 | -0.8131 | -0.8000 | -0.9446 | -0.9619 | -0.9194 | [illegible] |
| 0.400 | -0.5518 | -0.8098 | -0.8080 | -0.6787 | -0.9236 | -0.6889 | -0.3889 |
| 0.450 | [illegible] | -0.8005 | -0.6953 | -0.5228 | -0.4521 | -0.3322 | -0.1145 |
| 0.500 | -0.4676 | -0.5803 | -0.5731 | -0.2232 | -0.1303 | -0.1060 | -0.1476 |
| 0.550 | -0.4628 | -0.5020 | -0.3107 | -0.1788 | -0.1318 | -0.1195 | -0.2112 |
| 0.600 | [illegible] | -0.3327 | -0.2432 | -0.1373 | -0.1687 | | -0.2543 |
| 0.650 | -0.3321 | -0.2867 | -0.2494 | -0.2232 | -0.1774 | -0.1890 | -0.2546 |
| 0.700 | -0.2889 | -0.2404 | -0.2624 | -0.2452 | -0.1822 | -0.1939 | -0.2383 |
| 0.750 | -0.2167 | [illegible] | [illegible] | -0.2401 | -0.1843 | -0.1898 | -0.2176 |
| 0.825 | -0.1731 | [illegible] | [illegible] | -0.1347 | -0.1589 | -0.1876 | -0.1621 |
| 0.900 | -0.1004 | -0.0884 | -0.0503 | -0.1154 | -0.1044 | -0.1088 | -0.1169 |
| 0.940 | -0.0466 | -0.0132 | -0.0280 | -0.0540 | -0.0416 | -0.0432 | -0.0555 |
| 0.980 | -0.0000 | 0.0335 | 0.0376 | 0.0138 | 0.0216 | 0.0240 | -0.0000 |
| 1.000 | 0.0115 | 0.0512 | 0.0604 | 0.0748 | 0.0788 | 0.0721 | 0.0592 |

MACH=0.870 ALPHA=4.72 CL=0.428 LOWER SURFACE CP VALUES.

| X/C (ETA GROSS=) | 0.240 | 0.400 | 0.520 | 0.640 | 0.740 | 0.830 | 0.890 |
|---|---|---|---|---|---|---|---|
| 0.000 | | | 0.4871 | 0.4581 | 0.4860 | | 0.2998 |
| 0.025 | | | 0.2258 | 0.2087 | 0.1732 | 0.1324 | 0.0514 |
| 0.050 | | | | 0.0798 | | -0.0024 | -0.1040 |
| 0.075 | | | 0.0851 | 0.0063 | -0.0154 | -0.0624 | -0.1825 |
| 0.100 | 0.2188 | 0.0918 | 0.0304 | -0.0196 | -0.0515 | -0.1077 | -0.2272 |
| 0.150 | 0.1838 | 0.0883 | -0.0334 | -0.0714 | -0.1130 | -0.1648 | -0.2738 |
| 0.200 | | | | | | -0.2816 | -0.3531 |
| 0.250 | 0.0354 | -0.1142 | -0.1729 | -0.2217 | -0.2582 | -0.3641 | -0.3866 |
| 0.300 | | -0.1588 | | | | -0.3598 | -0.3414 |
| 0.350 | | -0.1641 | | -0.2758 | -0.3289 | -0.3513 | -0.2872 |
| 0.400 | -0.1032 | -0.1910 | -0.2183 | -0.2567 | -0.2804 | -0.2556 | -0.1782 |
| 0.450 | | -0.1705 | | -0.2088 | -0.2079 | -0.1554 | |
| 0.500 | | -0.1284 | | -0.1443 | -0.1187 | -0.0673 | |
| 0.550 | -0.1107 | -0.0583 | -0.0802 | -0.0548 | | | 0.0343 |
| 0.600 | | 0.0367 | | | 0.0551 | 0.0839 | |
| 0.700 | 0.1198 | 0.1615 | 0.1886 | 0.1824 | | 0.1588 | 0.1581 |
| 0.750 | | | | | 0.1681 | 0.1653 | |
| 0.850 | 0.1585 | 0.1747 | 0.1885 | 0.1741 | | 0.1543 | 0.1500 |
| 0.940 | | | | | | 0.1289 | |
| 0.980 | 0.1181 | 0.0888 | 0.1328 | 0.1388 | 0.1105 | 0.1099 | 0.0782 |
| 1.000 | 0.0115 | 0.0512 | 0.0604 | 0.0748 | 0.0788 | 0.0721 | 0.0592 |

MACH=0.888 ALPHA= 5.01 CL=0.454 UPPER SURFACE CP VALUES.

| X/C (ETA GROSS=) | 0.240 | 0.400 | 0.520 | 0.640 | 0.740 | 0.830 | 0.890 |
|---|---|---|---|---|---|---|---|
| 0.000 | | | 0.4714 | 0.4385 | 0.4428 | | 0.2919 |
| 0.010 | 0.1185 | -0.1678 | -0.2471 | -0.2715 | -0.2872 | -0.2344 | -0.1480 |
| 0.025 | -0.1183 | -0.4388 | -0.5249 | -0.5878 | -0.6146 | -0.5108 | -0.5441 |
| 0.040 | -0.2530 | -0.5578 | -0.6571 | -0.7231 | -0.7339 | -0.7052 | -0.7137 |
| 0.060 | -0.4791 | -0.7684 | -0.8422 | -0.8689 | -0.9111 | -0.8851 | -0.8596 |
| 0.080 | -0.6080 | -0.9284 | -0.9446 | -0.9811 | -0.9906 | -0.9802 | -0.9139 |
| 0.100 | -0.5388 | -1.0181 | -1.0190 | -1.0337 | -1.0486 | -1.0375 | -0.9872 |
| 0.120 | -0.5038 | -1.0360 | -1.0356 | -1.0781 | -1.0811 | -1.0587 | -1.0246 |
| 0.150 | -0.5208 | -1.0003 | -1.0555 | -1.0682 | -1.0920 | -1.0692 | -1.0488 |
| 0.200 | -0.5137 | -0.8798 | -1.0997 | -1.1043 | -1.1208 | | -1.0490 |
| 0.250 | -0.4908 | -0.7181 | -1.0464 | -1.0827 | -1.0936 | -1.0583 | -1.0179 |
| 0.300 | -0.5116 | -0.8245 | -0.8453 | -1.0423 | -1.0480 | -1.0080 | -0.9649 |
| 0.350 | -0.3611 | -0.8207 | -0.8317 | -0.9349 | -0.9994 | -0.9818 | -0.9405 |
| 0.400 | -0.6654 | -0.8259 | -0.8360 | -0.9103 | -0.9583 | -0.9329 | -0.8551 |
| 0.450 | -0.5509 | -0.8207 | -0.8407 | -0.5987 | -0.7583 | -0.6945 | -0.2694 |
| 0.500 | -0.4988 | -0.5870 | -0.6270 | -0.3624 | -0.2331 | -0.2253 | -0.1259 |
| 0.550 | -0.4830 | -0.5455 | -0.5037 | -0.1776 | -0.1840 | -0.0883 | -0.1405 |
| 0.600 | -0.4588 | -0.3838 | -0.2855 | -0.1780 | -0.1362 | | -0.1839 |
| 0.650 | -0.3820 | -0.2737 | -0.2377 | -0.2036 | -0.1360 | -0.1238 | -0.2039 |
| 0.700 | -0.2872 | -0.2375 | -0.2427 | -0.2214 | -0.1458 | -0.1435 | -0.2080 |
| 0.750 | -0.2250 | -0.2171 | -0.2488 | -0.2203 | -0.1453 | -0.1557 | -0.2006 |
| 0.825 | -0.1718 | -0.1567 | -0.1658 | -0.1617 | -0.1395 | -0.1518 | -0.1738 |
| 0.900 | -0.0989 | -0.0818 | -0.0818 | -0.1086 | -0.0955 | -0.0959 | -0.1149 |
| 0.940 | -0.0465 | -0.0113 | -0.0222 | -0.0487 | -0.0369 | -0.0382 | -0.0569 |
| 0.980 | 0.0018 | 0.0318 | 0.0417 | 0.0168 | 0.0234 | 0.0288 | -0.0009 |
| 1.000 | 0.0131 | 0.0430 | 0.0613 | 0.0733 | 0.0787 | 0.0709 | 0.0565 |

MACH=0.888 ALPHA= 5.01 CL=0.454 LOWER SURFACE CP VALUES.

| X/C (ETA GROSS=) | 0.240 | 0.400 | 0.520 | 0.640 | 0.740 | 0.830 | 0.890 |
|---|---|---|---|---|---|---|---|
| 0.000 | | | 0.4714 | 0.4385 | 0.4428 | | 0.2919 |
| 0.025 | | | 0.2530 | 0.2399 | 0.2021 | 0.1535 | 0.0824 |
| 0.050 | | | | 0.1087 | | 0.0233 | -0.0771 |
| 0.075 | | | 0.0886 | 0.0365 | 0.0133 | -0.0358 | -0.1571 |
| 0.100 | 0.2290 | 0.1131 | 0.0491 | 0.0069 | -0.0285 | -0.0848 | -0.2017 |
| 0.150 | 0.1771 | 0.0488 | -0.0188 | -0.0584 | -0.0819 | -0.1427 | -0.2512 |
| 0.200 | | | | | | -0.2432 | -0.3408 |
| 0.250 | 0.0508 | -0.0941 | -0.1585 | -0.2036 | -0.2350 | -0.3453 | -0.3641 |
| 0.300 | | -0.1334 | | | | -0.3508 | -0.3363 |
| 0.350 | | -0.1843 | | -0.2808 | -0.3084 | -0.3373 | -0.2844 |
| 0.400 | -0.0817 | -0.1732 | -0.2067 | -0.2458 | -0.2741 | -0.2468 | -0.1768 |
| 0.450 | | -0.1578 | | -0.2021 | -0.1962 | -0.1506 | |
| 0.500 | | -0.1187 | | -0.1360 | -0.1136 | -0.0839 | |
| 0.550 | -0.1038 | -0.0484 | -0.0538 | -0.0815 | | | 0.0334 |
| 0.600 | | 0.0443 | | | 0.0684 | 0.0867 | |
| 0.700 | 0.1250 | 0.1687 | 0.1705 | 0.1635 | | 0.1803 | 0.1581 |
| 0.750 | | | | | 0.1699 | 0.1651 | |
| 0.850 | 0.1582 | 0.1771 | 0.1882 | 0.1763 | | 0.1530 | 0.1508 |
| 0.940 | | | | | | 0.1273 | |
| 0.980 | 0.1188 | 0.0894 | 0.1360 | 0.1389 | 0.1121 | 0.1089 | 0.0781 |
| 1.000 | 0.0131 | 0.0430 | 0.0613 | 0.0733 | 0.0787 | 0.0709 | 0.0565 |

TABLE 9.7 (contd) M86 WING PRESSURE DISTRIBUTIONS

MACH=0.870 ALPHA=5.27 CL=0.480 UPPER SURFACE CP VALUES.

| X/C \ ETA GROSS= | 0.240 | 0.400 | 0.520 | 0.640 | 0.740 | 0.830 | 0.890 |
|---|---|---|---|---|---|---|---|
| 0.000 | | | 0.4551 | 0.4182 | 0.4198 | | 0.2860 |
| 0.010 | 0.0974 | -0.1960 | -0.2759 | -0.3102 | -0.3075 | -0.2765 | -0.1864 |
| 0.025 | -0.1952 | -0.4671 | -0.5539 | -0.6356 | -0.6588 | -0.5529 | -0.5761 |
| 0.040 | -0.2720 | -0.5922 | -0.6636 | -0.7549 | -0.7589 | -0.7383 | -0.7445 |
| 0.060 | -0.4936 | -0.7798 | -0.8819 | -0.9066 | -0.9358 | -0.9122 | -0.8869 |
| 0.080 | -0.5184 | -0.9459 | -0.9864 | -1.0018 | -1.0158 | -1.0040 | -0.9398 |
| 0.100 | -0.5550 | -1.0306 | -1.0431 | -1.0550 | -1.0720 | -1.0814 | -0.9901 |
| 0.120 | -0.5172 | -1.0611 | -1.0620 | -1.0981 | -1.1045 | -1.0818 | -1.0479 |
| 0.150 | -0.5350 | -1.0267 | -1.0739 | -1.1103 | -1.1162 | -1.0933 | -1.0743 |
| 0.200 | -0.5321 | -0.9488 | -1.1159 | -1.1266 | -1.1455 | | -1.0717 |
| 0.250 | -0.5073 | -0.7460 | -1.0942 | -1.1032 | -1.1194 | -1.0808 | -1.0438 |
| 0.300 | -0.5252 | -0.6506 | -0.9898 | -1.0654 | -1.0786 | -1.0408 | -0.9954 |
| 0.350 | -0.5756 | -0.6339 | -0.8577 | -1.0280 | -1.0372 | -1.0028 | -0.9778 |
| 0.400 | -0.6619 | -0.6450 | -0.8464 | -0.9728 | -0.9944 | -0.9701 | -0.9386 |
| 0.450 | -0.5876 | -0.6423 | -0.6647 | -0.6775 | -0.9619 | -0.8962 | -0.5888 |
| 0.500 | -0.5195 | -0.6059 | -0.6565 | -0.5225 | -0.5828 | -0.4216 | -0.1693 |
| 0.550 | -0.5020 | -0.5778 | -0.5066 | -0.2394 | -0.2099 | -0.1721 | -0.1217 |
| 0.600 | -0.4611 | -0.4546 | -0.2863 | -0.1734 | -0.1155 | | -0.1488 |
| 0.650 | -0.3558 | -0.2941 | -0.2325 | -0.1814 | -0.1075 | -0.0891 | -0.1702 |
| 0.700 | -0.2894 | -0.2341 | -0.2365 | -0.1926 | -0.1139 | -0.1062 | -0.1778 |
| 0.750 | -0.2273 | -0.2094 | -0.2330 | -0.1921 | -0.1160 | -0.1284 | -0.1781 |
| 0.825 | -0.1704 | -0.1482 | -0.1743 | -0.1620 | -0.1139 | -0.1357 | -0.1607 |
| 0.900 | -0.0941 | -0.0565 | -0.0769 | -0.0971 | -0.0798 | -0.0652 | -0.1113 |
| 0.940 | -0.0423 | -0.0093 | -0.0192 | -0.0412 | -0.0263 | -0.0323 | -0.0580 |
| 0.980 | 0.0060 | 0.0302 | 0.0406 | 0.0213 | 0.0293 | 0.0285 | -0.0024 |
| 1.000 | 0.0128 | 0.0423 | 0.0803 | 0.0748 | 0.0808 | 0.0725 | 0.0559 |

MACH=0.870 ALPHA=5.27 CL=0.480 LOWER SURFACE CP VALUES.

| X/C \ ETA GROSS= | 0.240 | 0.400 | 0.520 | 0.640 | 0.740 | 0.830 | 0.890 |
|---|---|---|---|---|---|---|---|
| 0.000 | | | 0.4551 | 0.4182 | 0.4198 | | 0.2860 |
| 0.025 | | | 0.2789 | 0.2566 | 0.2301 | 0.1910 | 0.1153 |
| 0.050 | | | | 0.1304 | | 0.0518 | -0.0444 |
| 0.075 | | | 0.1102 | 0.0575 | 0.0355 | -0.0136 | -0.1285 |
| 0.100 | 0.2490 | 0.1300 | 0.0729 | 0.0283 | -0.0090 | -0.0810 | -0.1747 |
| 0.150 | 0.1952 | 0.0801 | 0.0057 | -0.0298 | -0.0744 | -0.1201 | -0.2303 |
| 0.200 | | | | | | -0.2191 | -0.3154 |
| 0.250 | 0.0665 | -0.0809 | -0.1358 | -0.1619 | -0.2196 | -0.3157 | -0.3502 |
| 0.300 | | -0.1273 | | | | -0.3283 | -0.3206 |
| 0.350 | | -0.1559 | | -0.2418 | -0.2964 | -0.3237 | -0.2728 |
| 0.400 | -0.0750 | -0.1657 | -0.1694 | -0.2289 | -0.2677 | -0.2435 | -0.1715 |
| 0.450 | | -0.1462 | | -0.1676 | -0.1937 | -0.1512 | |
| 0.500 | | -0.1066 | | -0.1268 | -0.1108 | -0.0698 | |
| 0.550 | -0.0872 | -0.0396 | -0.0470 | -0.0428 | | | 0.0329 |
| 0.600 | | 0.0500 | | | 0.0802 | 0.0843 | |
| 0.700 | 0.1339 | 0.1728 | 0.1729 | 0.1696 | | 0.1981 | 0.1552 |
| 0.750 | | | | | 0.1711 | 0.1645 | |
| 0.800 | 0.1667 | 0.1604 | 0.1665 | 0.1769 | | 0.1536 | 0.1465 |
| 0.850 | | | | | | 0.1296 | |
| 0.900 | 0.1229 | 0.0973 | 0.1328 | 0.1413 | 0.1138 | 0.1113 | 0.0782 |
| 1.000 | 0.0128 | 0.0423 | 0.0803 | 0.0746 | 0.0808 | 0.0725 | 0.0559 |

TABLE 9.7 (contd) M86 WING PRESSURE DISTRIBUTIONS

MACH=0.900 ALPHA=4.18 CL=0.404 UPPER SURFACE CP VALUES.

| X/C \ ETA GROSS= | 0.240 | 0.400 | 0.520 | 0.640 | 0.740 | 0.830 | 0.890 |
|---|---|---|---|---|---|---|---|
| 0.000 | | | 0.5507 | 0.5211 | 0.5284 | | 0.0882 |
| 0.010 | 0.2278 | -0.0222 | -0.0851 | -0.0946 | -0.0887 | -0.0488 | 0.0282 |
| 0.025 | -0.0095 | -0.2865 | -0.3573 | -0.4243 | -0.4322 | -0.3295 | -0.3567 |
| 0.040 | -0.1466 | -0.4215 | -0.5192 | -0.5757 | -0.5782 | -0.5367 | -0.5318 |
| 0.060 | -0.3822 | -0.6538 | -0.6875 | -0.7355 | -0.7570 | -0.7063 | -0.6846 |
| 0.080 | -0.3953 | -0.8039 | -0.7835 | -0.8240 | -0.8282 | -0.8014 | -0.7382 |
| 0.100 | -0.4305 | -0.8442 | -0.8635 | -0.8740 | -0.8809 | -0.8638 | -0.7953 |
| 0.120 | -0.4080 | -0.8491 | -0.8813 | -0.9123 | -0.9177 | -0.8863 | -0.8525 |
| 0.150 | -0.4359 | -0.8540 | -0.9250 | -0.9320 | -0.9377 | -0.8957 | -0.8849 |
| 0.200 | -0.4354 | -0.7533 | -0.9656 | -0.9557 | -0.9657 | | -0.8916 |
| 0.250 | -0.4227 | -0.6355 | -0.8720 | -0.9384 | -0.9482 | -0.8908 | -0.8701 |
| 0.300 | -0.4411 | -0.5535 | -0.6464 | -0.8956 | -0.9033 | -0.8543 | -0.8383 |
| 0.350 | -0.5065 | -0.5580 | -0.5526 | -0.8403 | -0.8683 | -0.8355 | -0.8294 |
| 0.400 | -0.6041 | -0.5872 | -0.5763 | -0.5975 | -0.8372 | -0.8172 | -0.7883 |
| 0.450 | -0.5074 | -0.5785 | -0.5918 | -0.5271 | -0.7977 | -0.8137 | -0.7766 |
| 0.500 | -0.4647 | -0.5520 | -0.5847 | -0.5204 | -0.5070 | -0.8308 | -0.8190 |
| 0.550 | -0.4552 | -0.5431 | -0.5542 | -0.5163 | -0.4890 | -0.7916 | -0.5382 |
| 0.600 | -0.4734 | -0.5473 | -0.5476 | -0.5145 | -0.5273 | | -0.2084 |
| 0.650 | -0.4746 | -0.5349 | -0.5574 | -0.5381 | -0.3562 | -0.1001 | -0.1087 |
| 0.700 | -0.4374 | -0.4858 | -0.5590 | -0.5312 | -0.0981 | -0.0273 | -0.0727 |
| 0.750 | -0.3717 | -0.3273 | -0.2958 | -0.1573 | -0.0753 | -0.0318 | -0.0707 |
| 0.825 | -0.2272 | -0.1402 | -0.1288 | -0.1010 | -0.0625 | -0.0564 | -0.0828 |
| 0.900 | -0.1071 | -0.0448 | -0.0390 | -0.0514 | -0.0357 | -0.0355 | -0.0569 |
| 0.940 | -0.0480 | -0.0037 | 0.0093 | -0.0039 | 0.0102 | 0.0098 | -0.0144 |
| 0.980 | 0.0009 | 0.0310 | 0.0588 | 0.0532 | 0.0632 | 0.0642 | 0.0365 |
| 1.000 | 0.0160 | 0.0455 | 0.0882 | 0.1035 | 0.1148 | 0.1030 | 0.0893 |

MACH=0.900 ALPHA=4.18 CL=0.404 LOWER SURFACE CP VALUES.

| X/C \ ETA GROSS= | 0.240 | 0.400 | 0.520 | 0.640 | 0.740 | 0.830 | 0.890 |
|---|---|---|---|---|---|---|---|
| 0.000 | | | 0.5507 | 0.5211 | 0.5284 | | 0.0882 |
| 0.025 | | | 0.1655 | 0.1393 | 0.0951 | 0.0347 | -0.0569 |
| 0.050 | | | | 0.0108 | | -0.0690 | -0.1982 |
| 0.075 | | | 0.0166 | -0.0584 | -0.0858 | -0.1979 | -0.2680 |
| 0.100 | 0.1975 | 0.0815 | -0.0023 | -0.0848 | -0.1160 | -0.1804 | -0.3084 |
| 0.150 | 0.1472 | -0.0037 | -0.0750 | -0.1288 | -0.1652 | -0.2355 | -0.3527 |
| 0.200 | | | | | | -0.3348 | -0.4536 |
| 0.250 | 0.0158 | -0.1472 | -0.2329 | -0.2867 | -0.3298 | -0.4471 | -0.5576 |
| 0.300 | | -0.2021 | | | | -0.5181 | -0.5908 |
| 0.350 | | -0.2398 | | -0.3440 | -0.4123 | -0.5258 | -0.2345 |
| 0.400 | -0.1363 | -0.2585 | -0.2792 | -0.3167 | -0.3783 | -0.2940 | -0.1573 |
| 0.450 | | -0.2288 | | -0.2541 | -0.2504 | -0.1604 | |
| 0.500 | | -0.1658 | | -0.1736 | -0.1367 | -0.0642 | |
| 0.550 | -0.1639 | -0.0791 | -0.0832 | -0.0701 | | | 0.0357 |
| 0.600 | | 0.0218 | | | 0.0535 | 0.0882 | |
| 0.700 | 0.1035 | 0.1550 | 0.1588 | 0.1573 | | 0.1659 | 0.1625 |
| 0.780 | | | | | 0.1783 | 0.1775 | |
| 0.850 | 0.1521 | 0.1751 | 0.1667 | 0.1817 | | 0.1713 | 0.1651 |
| 0.940 | | | | | | 0.1514 | |
| 0.980 | 0.1167 | 0.0938 | 0.1364 | 0.1584 | 0.1384 | 0.1387 | 0.1043 |
| 1.000 | 0.0160 | 0.0455 | 0.0882 | 0.1035 | 0.1146 | 0.1030 | 0.0893 |

MACH=0.900 ALPHA=5.27 CL=0.516 UPPER SURFACE CP VALUES.

| X/C \ ETA GROSS= | 0.240 | 0.400 | 0.520 | 0.640 | 0.740 | 0.830 | 0.890 |
|---|---|---|---|---|---|---|---|
| 0.000 | | | 0.4898 | 0.4569 | 0.4642 | | 0.0701 |
| 0.010 | 0.1428 | -0.1328 | -0.2034 | -0.2233 | -0.2209 | -0.1821 | -0.0941 |
| 0.025 | -0.0861 | -0.3934 | -0.4742 | -0.5449 | -0.5587 | -0.4438 | -0.4759 |
| 0.040 | -0.2209 | -0.5178 | -0.6065 | -0.6694 | -0.6697 | -0.6325 | -0.6380 |
| 0.060 | -0.4374 | -0.7026 | -0.7764 | -0.8204 | -0.8423 | -0.8032 | -0.7640 |
| 0.080 | -0.4676 | -0.8679 | -0.8831 | -0.9110 | -0.9220 | -0.8977 | -0.8378 |
| 0.100 | -0.5045 | -0.9491 | -0.9560 | -0.9651 | -0.9762 | -0.9546 | -0.8872 |
| 0.120 | -0.4708 | -0.9845 | -0.9761 | -1.0060 | -1.0096 | -0.9776 | -0.9418 |
| 0.150 | -0.4915 | -0.9557 | -0.9965 | -1.0203 | -1.0278 | -0.9906 | -0.9719 |
| 0.200 | -0.4927 | -0.9188 | -1.0394 | -1.0430 | -1.0540 | | -0.9798 |
| 0.250 | -0.4740 | -0.7850 | -1.0236 | -1.0268 | -1.0335 | -0.9867 | -0.9591 |
| 0.300 | -0.4970 | -0.6275 | -0.9571 | -0.9952 | -0.9990 | -0.9533 | -0.9328 |
| 0.350 | -0.5422 | -0.6053 | -0.7001 | -0.9656 | -0.9687 | -0.9263 | -0.9245 |
| 0.400 | -0.6625 | -0.6165 | -0.6243 | -0.9335 | -0.9458 | -0.9195 | -0.8929 |
| 0.450 | -0.5474 | -0.6301 | -0.6365 | -0.9088 | -0.9307 | -0.9182 | -0.8863 |
| 0.500 | -0.5082 | -0.6010 | -0.6302 | -0.6098 | -0.9081 | -0.9379 | -0.9092 |
| 0.550 | -0.4982 | -0.5952 | -0.6282 | -0.5657 | -0.6973 | -0.9379 | -0.9342 |
| 0.600 | -0.5188 | -0.5980 | -0.6079 | -0.5592 | -0.8881 | | -0.7385 |
| 0.650 | -0.5228 | -0.5898 | -0.6163 | -0.5896 | -0.6522 | -0.4712 | -0.3868 |
| 0.700 | -0.4847 | -0.5995 | -0.6288 | -0.6173 | -0.4113 | -0.3649 | -0.3391 |
| 0.750 | -0.4619 | -0.4169 | -0.4795 | -0.4149 | -0.1007 | -0.2580 | -0.2323 |
| 0.825 | -0.3104 | -0.1616 | -0.1404 | -0.0773 | -0.0140 | -0.0655 | -0.1602 |
| 0.900 | -0.1379 | -0.0738 | -0.0362 | -0.0134 | 0.0124 | 0.0243 | -0.0635 |
| 0.940 | -0.0703 | -0.0392 | 0.0061 | 0.0259 | 0.0430 | 0.0636 | -0.0040 |
| 0.980 | -0.0173 | -0.0082 | 0.0446 | 0.0701 | 0.0818 | 0.1019 | 0.0480 |
| 1.000 | 0.0044 | 0.0109 | 0.0824 | 0.1081 | 0.1281 | 0.1110 | 0.0737 |

MACH=0.900 ALPHA=5.27 CL=0.516 LOWER SURFACE CP VALUES.

| X/C \ ETA GROSS= | 0.240 | 0.400 | 0.520 | 0.640 | 0.740 | 0.830 | 0.890 |
|---|---|---|---|---|---|---|---|
| 0.000 | | | 0.4898 | 0.4569 | 0.4642 | | 0.0701 |
| 0.025 | | | 0.2724 | 0.2459 | 0.2075 | 0.1620 | 0.0758 |
| 0.050 | | | | 0.1188 | | 0.0272 | -0.0748 |
| 0.075 | | | 0.1052 | 0.0427 | 0.0171 | -0.0313 | -0.1584 |
| 0.100 | 0.2555 | 0.1348 | 0.0677 | 0.0198 | -0.0247 | -0.0826 | -0.2112 |
| 0.150 | 0.2046 | 0.0852 | -0.0023 | -0.0471 | -0.0904 | -0.1487 | -0.2728 |
| 0.200 | | | | | | -0.2518 | -0.3799 |
| 0.250 | 0.0747 | -0.0822 | -0.1535 | -0.2084 | -0.2474 | -0.3672 | -0.4688 |
| 0.300 | | -0.1354 | | | | -0.4169 | -0.4218 |
| 0.350 | | -0.1890 | | -0.2761 | -0.3447 | -0.3830 | -0.2958 |
| 0.400 | -0.0782 | -0.1659 | -0.2174 | -0.2590 | -0.3067 | -0.2709 | -0.1835 |
| 0.450 | | -0.1898 | | -0.2122 | -0.2180 | -0.1571 | |
| 0.500 | | -0.1282 | | -0.1465 | -0.1218 | -0.0852 | |
| 0.550 | -0.1078 | -0.0506 | -0.0590 | -0.0546 | | | 0.0281 |
| 0.600 | | 0.0437 | | | 0.0802 | 0.0877 | |
| 0.700 | 0.1270 | 0.1698 | 0.1715 | 0.1671 | | 0.1635 | 0.1524 |
| 0.780 | | | | | 0.1782 | 0.1729 | |
| 0.850 | 0.1696 | 0.1783 | 0.1666 | 0.1805 | | 0.1659 | 0.1542 |
| 0.940 | | | | | | 0.1473 | |
| 0.980 | 0.1129 | 0.0758 | 0.1203 | 0.1503 | 0.1453 | 0.1384 | 0.0926 |
| 1.000 | 0.0044 | 0.0109 | 0.0824 | 0.1081 | 0.1281 | 0.1110 | 0.0737 |

TABLE 9.7 (contd) M86 WING PRESSURE DISTRIBUTIONS

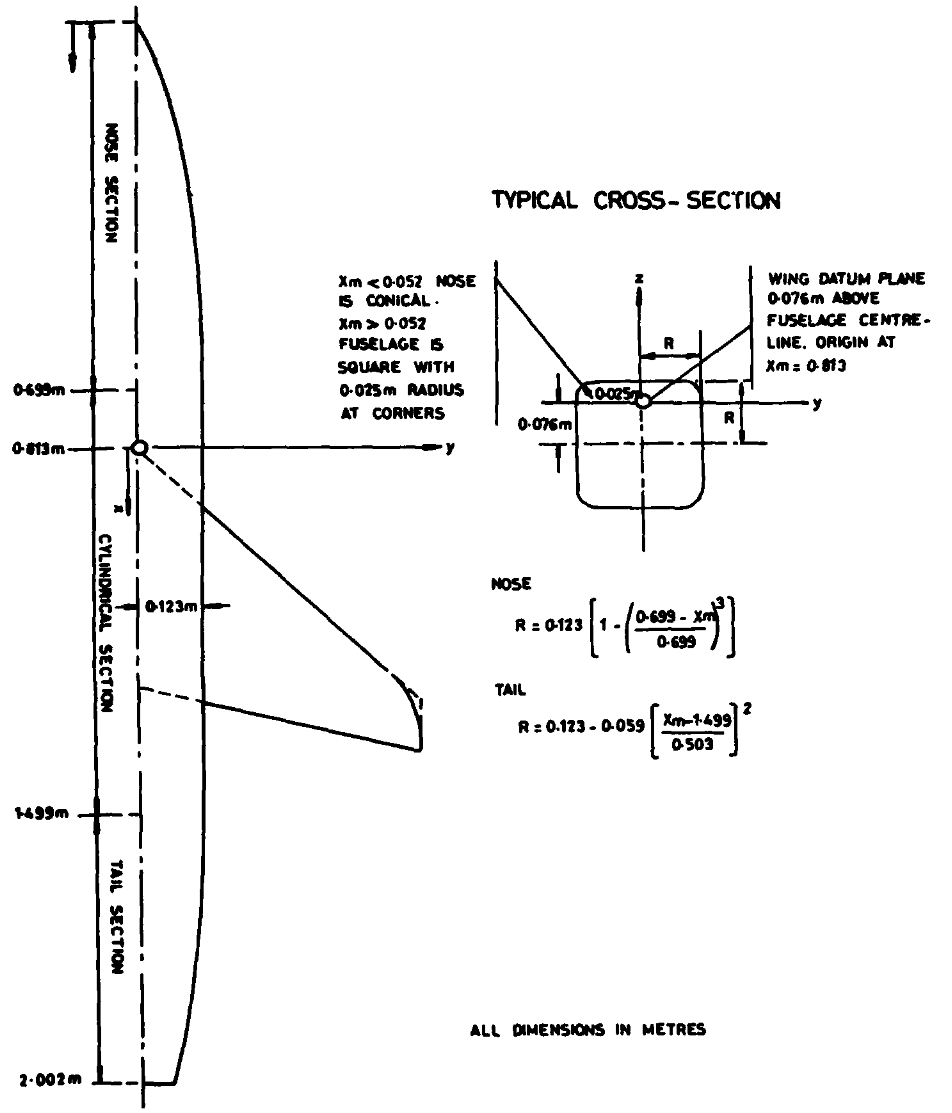



FIGURE 9.1 LAYOUT OF MODEL M86

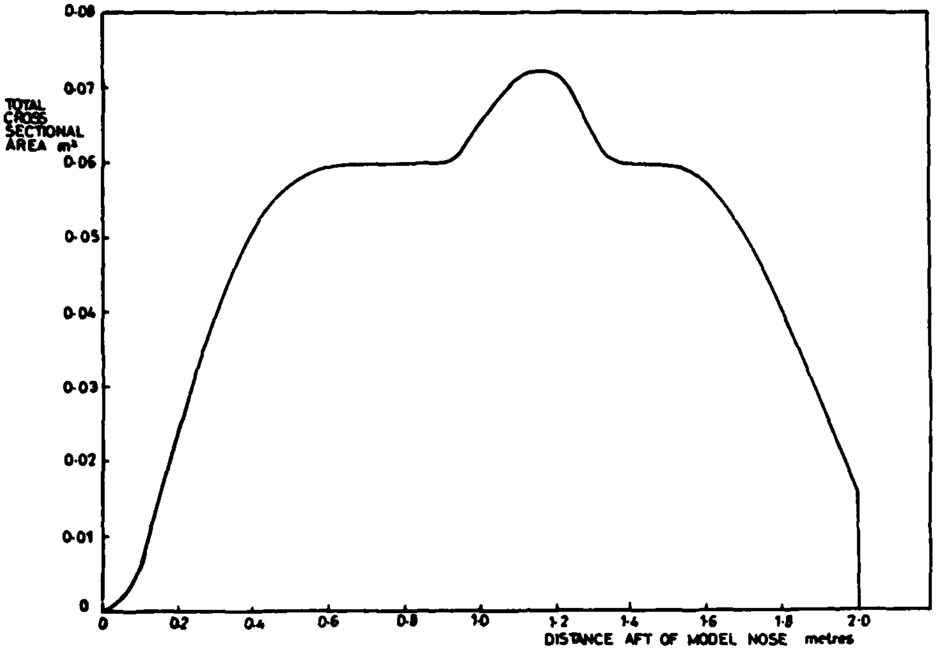



FIGURE 9.2 CROSS-SECTIONAL DEVELOPMENT

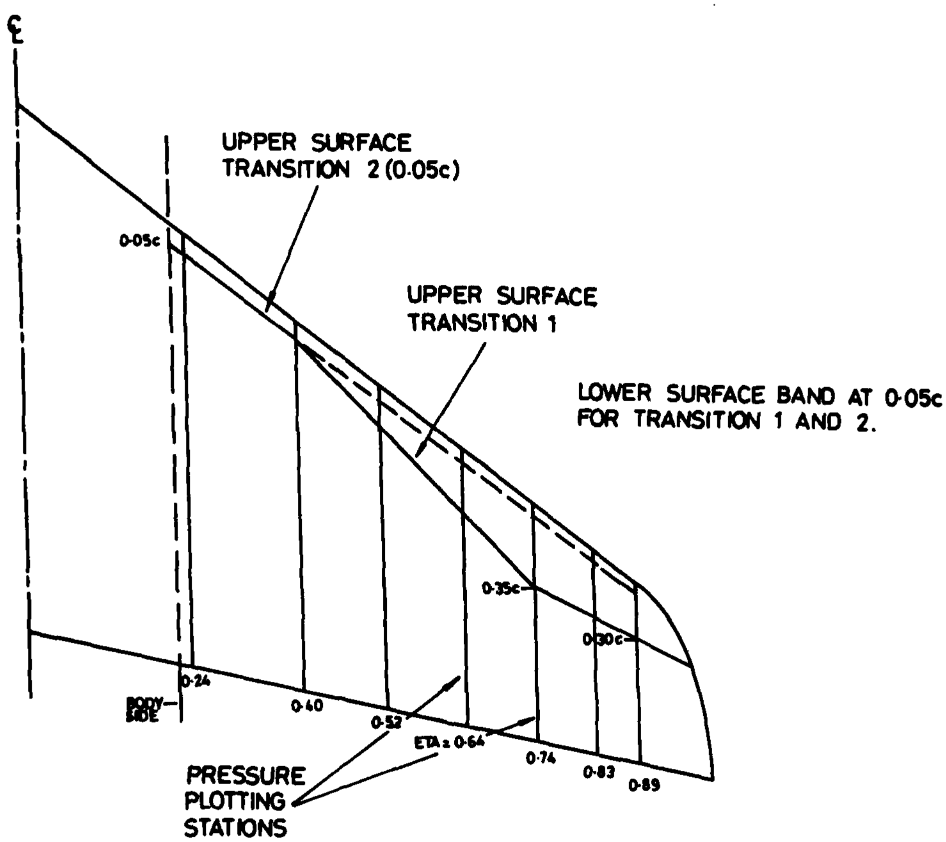



FIGURE 9.3 TRANSITION POSITION

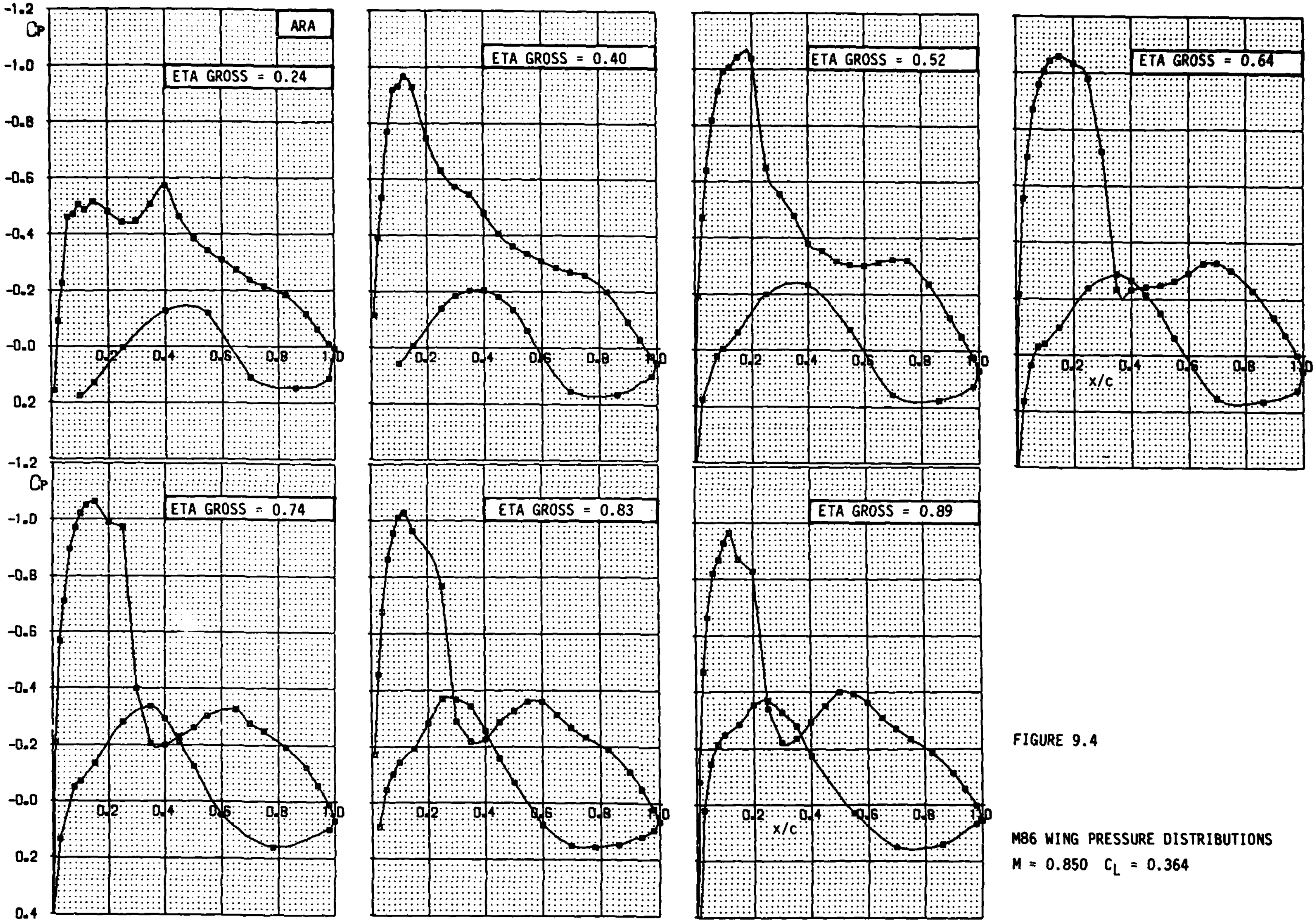



FIGURE 9.4

M86 WING PRESSURE DISTRIBUTIONS

$M = 0.850 \quad C_L = 0.364$

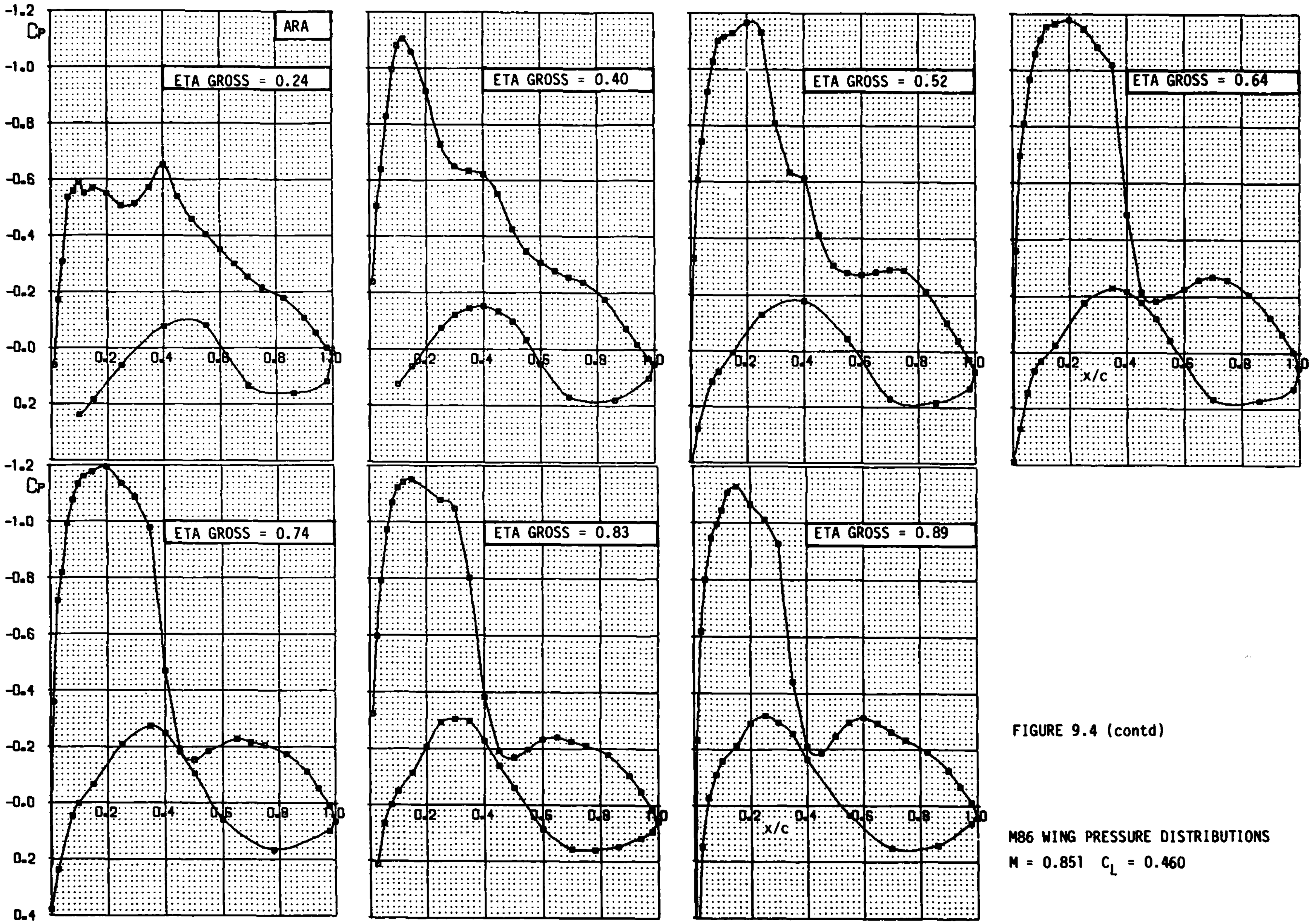



FIGURE 9.4 (contd)

M86 WING PRESSURE DISTRIBUTIONS
$M = 0.851 \quad C_L = 0.460$

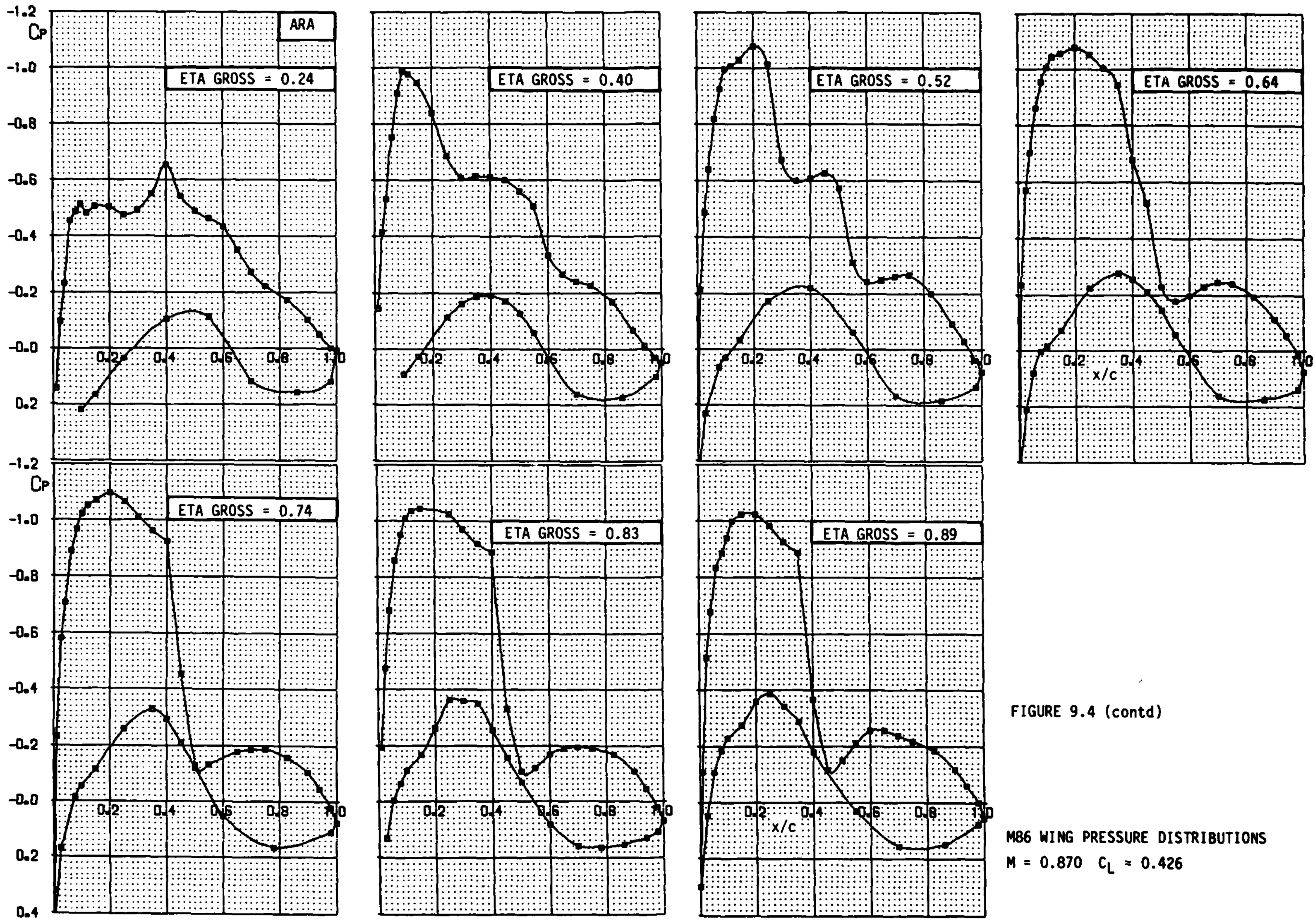



FIGURE 9.4 (contd)

M86 WING PRESSURE DISTRIBUTIONS

M = 0.870 $C_L$ = 0.426

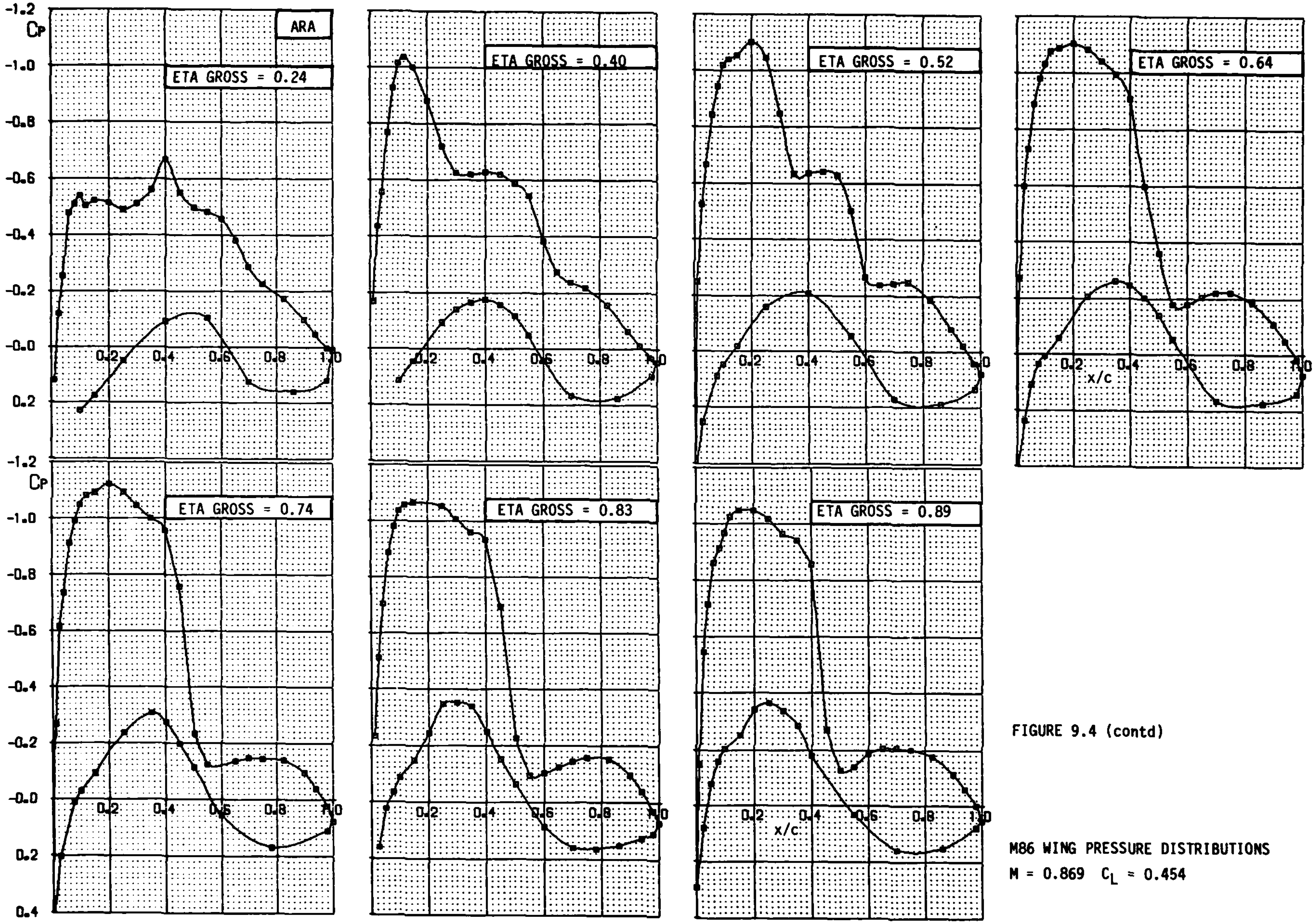



FIGURE 9.4 (contd)

M86 WING PRESSURE DISTRIBUTIONS

M = 0.869 $C_L$ = 0.454

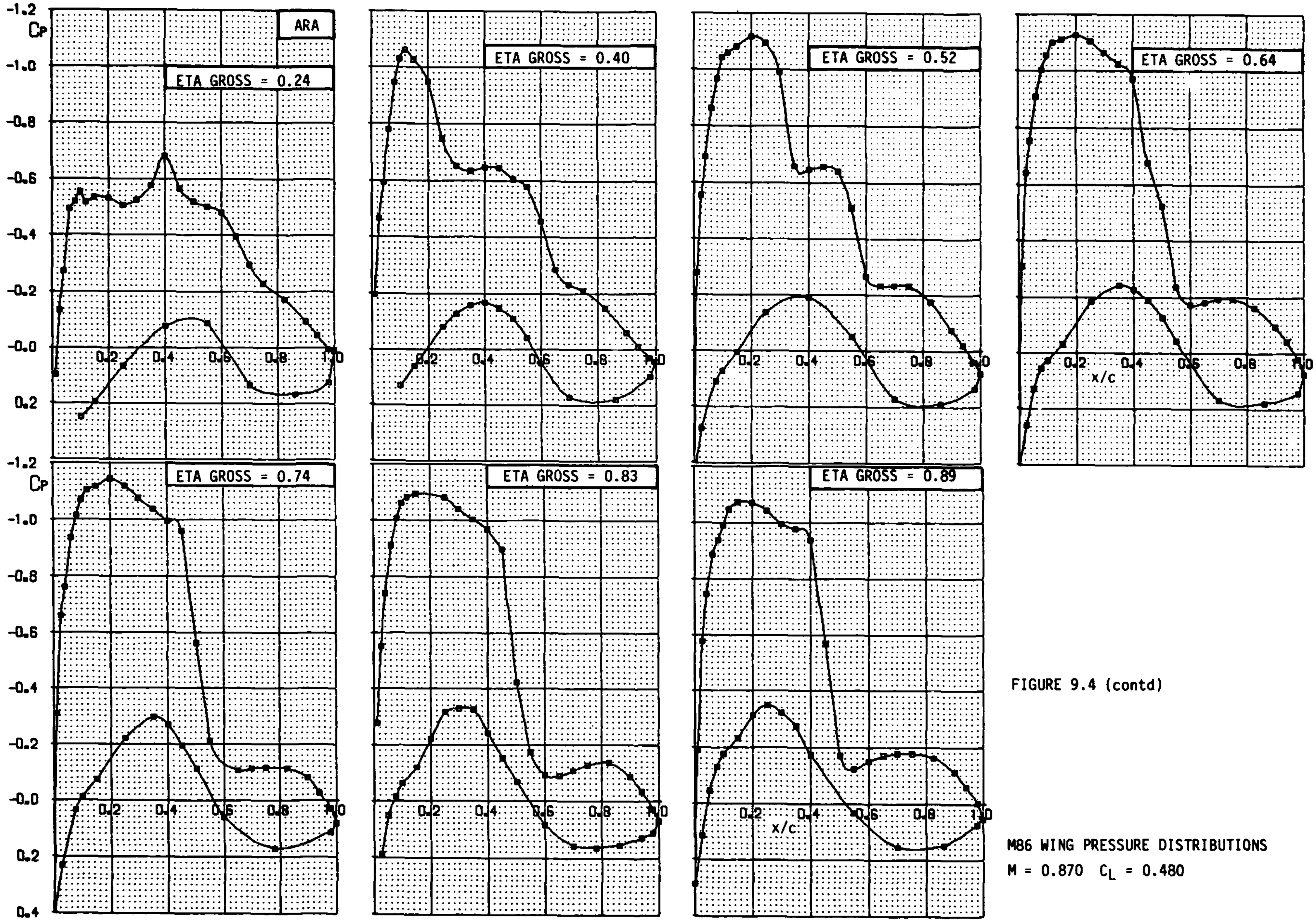



FIGURE 9.4 (contd)

M86 WING PRESSURE DISTRIBUTIONS

M = 0.870 $C_L$ = 0.480

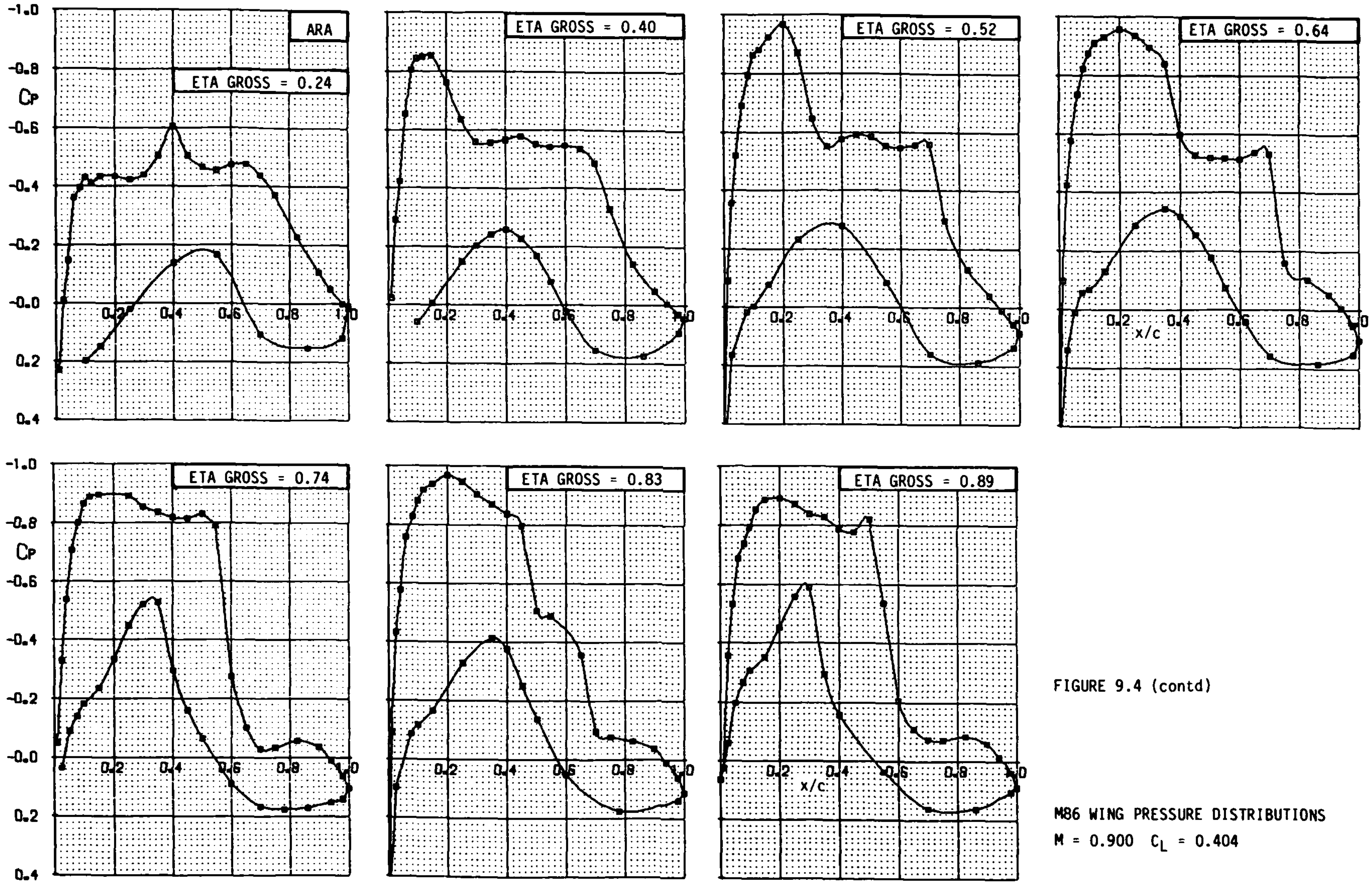



FIGURE 9.4 (contd)

M86 WING PRESSURE DISTRIBUTIONS
M = 0.900 $C_L$ = 0.404

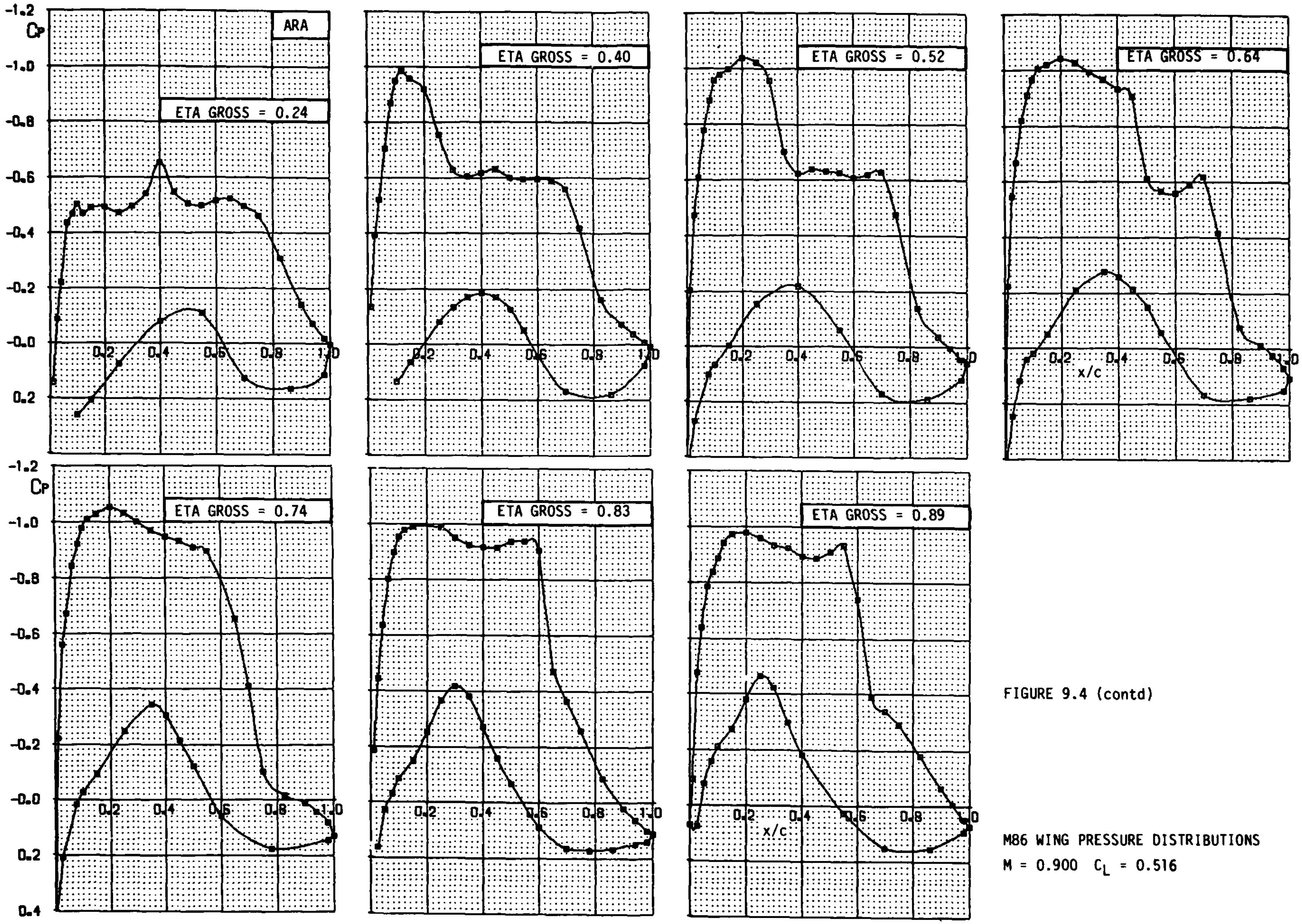



FIGURE 9.4 (contd)

M86 WING PRESSURE DISTRIBUTIONS

M = 0.900 $C_L$ = 0.516

# 10. PRESSURE DISTRIBUTION ON A SWEPT WING AIRCRAFT IN FLIGHT

by
Arild Bertelrud
FFA The Aeronautical Research Institute of Sweden
S-161 11 BROMMA, Sweden

## 10.1 INTRODUCTION

The data presented here is part of a comprehensive data base developed for the flow on a swept wing aircraft under flight conditions. Only four cases among more than thirty in existence are presented, and the data concerns pressure distributions, some skin friction information and very limited boundary layer results.

The full data base contains several other types of data (including turbulence measurements), measurements taken under instationary conditions as well as particular investigations concerning drag reduction, junction flow, transition etc.

The data structure obtained during a flight test differs from tunnel results in several respects;

- ample and redundant data with elaborate checking of data validity and repeatability are required,

- forced $\alpha$-M-H combinations,

- real life conditions, i.e. no wind tunnel walls, atmospheric turbulence (intensity and scale) varies with each flight and each altitude.

For the present tests the following should also be observed;

- natural transition (although some experiments were performed with transition trips and artificial roughness - not reported here),

- all data obtained are for trimmed conditions; i.e. the stabilizer/elevator has slightly different setting for each flight condition (off-trim conditions have been performed but are not reported here).

## 10.2 DATA SET

1. <u>General description</u>

| | | |
|---|---|---|
| 1.1 | Model designation or name | Aircraft: SAAB A32A Lansen. Serial # 32209. |
| 1.2 | Model type (e.g. full span wing-body, semi-span wing) | Swept wing attack aircraft: Low winged. |
| 1.3 | Design requirements/conditions | Design: M = 0.9. |
| 1.4 | Additional remarks | Investigation generally has clean configuration; i.e.:<br>- No external fuel tanks, ordnance or pods.<br>- Zero flap.<br>- Trimmed flight. |

2. <u>Model geometry</u>

| | | |
|---|---|---|
| 2.1 | Wing data | See Fig. 1 and Table II.1 |
| 2.1.1 | Wing planform | Swept wing with straight leading and trailing edges. |
| 2.1.2 | Aspect ratio | 4.519. |
| 2.1.3 | Leading-edge sweep | 38.9 deg. |
| 2.1.4 | Trailing-edge sweep | 18.9 deg. |
| 2.1.5 | Taper ratio | 0.330. |
| 2.1.6 | Twist | None, unloaded. |
| 2.1.7 | Mean aerodynamic chord | 3.140 m. |
| 2.1.8 | Span or semispan | 13.00 m span. |

| | | |
|---|---|---|
| 2.1.9 | Number of airfoil sections used to define wing | 1 covering main wing (out to 92.9% semispan) 8 covering wing tip. (See Table II.2) NACA 64A010 normal to 25% chord line defines main wing airfoil. (See Table II.1) |
| 2.1.10 | Spanwise location of reference section and section coordinates (Note if ordinates are design or actual measured values) | Data according to specifications on main wing, and results from templates used in the nose region at 8 spanwise locations. (Se Figure 2.) See Tables III.1 and III.2 |
| 2.1.11 | Lofting procedure between reference sections | Unknown |
| 2.1.12 | Form of wing-body fillet, strakes | Fillet data: See Figure 3 |
| 2.1.13 | Form of wing tip | Wing tip data: See Table II.2 for measured coordinates. |
| 2.2 | Body data (detail description of body geometry) | See Figure 4 |
| 2.3.1 | Relative body diameter (Average body diameter at wing location divided by wing span | ~ 0.15 |
| 2.3.2 | Relative vertical location of wing (height above or below body axis divided by average body radius at wing location) | ~ -0.7 low-wing. See Figure 1 |
| 2.3.3 | Wing setting angle | 0 deg. |
| 2.3.4 | Dihedral | 0 deg. |
| 2.4 | Cross sectional area development | See Figure 4 |
| 2.5 | Fabrication tolerances/waviness | Not known. |
| 2.6 | Additional remarks | Additional information on tail surfaces given in Figure 1. |

3. Wind tunnel

| | | |
|---|---|---|
| 3.1 | Designation | Flight experiment. Only appropriate numbers indicated. |
| 3.2 | Type of tunnel | - |
| 3.2.1 | - | |
| 3.2.2 | Stagnation pressure | Approx. 22 to 120 kN/m$^2$ depending on Mach number and altitude. |
| 3.2.3 | Stagnation temperature | varies - depends on altitude (1 to 12 km) and Mach number (stall to 0.95). $T_o$= 225-310 $^o$K. |
| 3.3 | Test section | - |
| 3.4 | Flow field | Atmosphere; defined through meteorological information each flight. Flight outside of clouds only. Turbulence level may vary with day, time of day and altitude. |
| 3.5 | Freestream Mach number | |
| 3.5.1 | Range | Approx. 0.25 to 0.95. See Figure 5 for flight envelope. |
| 3.5.2 | Pressures used to determine Mach number (e.g., settling chamber total pressure and plenum chamber pressure) | Stagnation and static pressures: From ordinary pitot tube of aircraft |
| 3.5.3 | Accuracy of Mach number determination ($\Delta M$) | $\Delta M = \pm 0.002$ |

| | |
|---|---|
| 3.5.4 Maximum Mach number variation | ±0.001 during data collection time; 20 secs. |
| **3.6 Reynolds number range** | |
| 3.6.1 Unit Reynolds number range | 3 to 15 millions/meter. See Figure 5. Flight envelope. |
| 3.6.2 Means of varying Reynolds number (e.g. by pressurization) | Reynolds number, angle of attack and Mach number: Varied through; - altitude variation - weight variation - flight at load factors different from 1 |
| 3.7 Temperature range and dewpoint. Can temperature be controlled? | Standard ambient temperatures at H= 7 and 10 km and $^{O}K$. Temperature cannot be controlled. Dewpoint may be estimated from atmospheric data; flights are performed in clear air. |
| **3.8 Model attitudes** | |
| 3.8.1 Angle of attack, | 0.9 to 10 deg. |
| yaw, | 0 deg. Deliberate yaw is flown occasionally. Yaw is measured. |
| roll | 0 deg. for stationary flight. 360 deg. rolls performed each flight. |
| 3.8.2 Accuracy in determining angles | $\alpha$= ±0.1 deg. at cruise; $\alpha$= ±0.2 deg. at stall |
| 3.9 Organization operating the aircraft | Swedish Air Force FMV-PROV, Malmslätt, Sweden |
| 3.10 Who is to be Contacted for Additional information | A. Bertelrud, FFA, The Aeronautical Research Institute os Sweden, S-161 11 Bromma, Sweden |
| 3.11 - | |
| 3.12 Additional remarks | Comprehensive data-base including data files and access programs (FORTRAN) is being established. This data-base contains many more conditions as well as results from other probe types. |

## 4. Tests

| | |
|---|---|
| 4.1 Type of tests | Surface pressure, Boundary layers, Skin friction. |
| 4.2 Wing Span or Semispan to Tunnel Width | Zero. Free flight |
| **4.3 Test Conditions** | |
| 4.3.1 Angle of attack | 0 to 10 deg. During maneouvers negative angles (nz= -1 to +3). |
| 4.3.2 Mach number | 0.25 to 0.95. Even lower obtained at stall. 0.95 obtained during dive at altitude -- 0.92 at stationary, level flight. |
| 4.3.3 Dynamic pressure | Approx. 2.5 to 29 kN/$m^2$. See Figure 5. |
| 4.3.4 Reynolds number | 14 to 32 millions, based on MAC. |
| 4.3.5 Stagnation temperature | Varies. ICAO standard values may be used. See Table I. |
| **4.4 Transition** | |
| 4.4.1 Free or fixed | Free transition for the present cases. (For some flights transition was triggered along the attachment line with a wire. In other cases along the leading edge using a tape.) |
| 4.4.2 Postition of free transition | - |
| 4.4.3 Position of fixed transition, width of strips, size and type of roughness | - |
| 4.4.4 Were checks made to detemine if transition occurred at trip locations? | - |

| | |
|---|---|
| 4.5 Bending or torsion under load | |
| 4.5.1 Describe any aero-elastic measurements made during tests | Strain gages were used at several spanwise positions to determine static and dynamic deflections during flight. |
| 4.5.2 Describe result of any bench calibrations | |
| 4.6 Were different sized models used in wind tunnel investigations? If so, indicate sizes. | Models of the aircraft has been tested in wind tunnels; both full and half models as well as wing-alone cases. |
| 4.7 Areas and lengths used to form coefficients | Area used is wing reference area 37.4 $m^2$ Length used is Mean Aerodyn. Chord 3.140 m |
| 4.8 References on tests | See References 1 to 4. |
| 4.9 Related reports | See Reference 5. |

5. Instrumentation

| | |
|---|---|
| 5.1 Surface pressure measurements | |
| 5.1.1 Pressure orifices in wing. Location and number on upper and lower surfaces | Pressure orifices in wing: (See Tables III.1 to III.4.) Nose region 130 taps, wing tip 59 taps, aileron 16 taps. Movable probes 250 positions (approx.) |
| 5.1.2 Pressure orifices on fuselage. Location and number. | Pressure orifices on fuselage, (See Table III.5.): Forward part 30 taps. Movable probes 30 positions (approx.). |
| 5.1.3 Pressure orifices on components. Give component and orifice location | Orifices on stabilizer (See Tables III.6 and III.7.): Nose region 47 taps. Tip 51 taps. |
| 5.1.4 Geometry of orifices | Round holes, 0.5 mm diameter. |
| 5.3 Boundary layer and flow-field measurements | |
| 5.3.1 Boundary layer rakes | 1. Total and static pressures, 2. Pressures and split-films, 3. Hot wires. Positions: An array of 5×4 on main wing as well as some positions in the leading edge region. |
| 5.3.2 Probe dimension relative to boundary layer thickness | 0.025 - 0.10 for data presented. |
| 5.3.3 Laser-doppler velocimeter. Give description of apparatus and accuracy | No. |
| 5.3.4 Method and/or instrument used to determine boundary layer transition | Modified Preston tubes, Heated films (McCroskey type). |
| 5.3.5 Describe any downstream rakes or probes used. Reason for use. | - |
| 5.4 Surface flow visualization | |
| 5.4.1 Indicate method used to visualization flow | Tufts; used on wing and fuselage: Movies at 24-300 fr/sec was used, and photographing was performed from cockpit in aircraft (close range--inside wing-tip). |
| 5.4.2 Accuracy of method | - |
| 5.5 Skin friction measurements | |
| 5.5.1 Type of instrument | Modified Preston tubes<br>Heated surface films (McCroskey type)<br>Stanton tube (razor blades) |
| 5.5.2 Geometry and accuracy of instrument | Preston tube diameter: 2 mm; Accuracy for moderate crossflow ±3%. Heated films: (Magnitude & direction of skin friction):Accuracy ±10% in magnitude; ±1 deg. in direction. |

| | | |
|---|---|---|
| 5.5.3 | Locations where probe used | Preston tubes used at approx. 250 pos. on both sides of wing and approx. 30 pos. on fuselage. Heated films used on 17 positions on wing. |
| 5.6 | Simulation of exhaust jet | Measurements performed with engine on only. |

## 6. Data

### 6.1 Accuracy

| | | |
|---|---|---|
| 6.1.1 | Pressure coefficients | Generally within 2% of max. neg. or pos. value |
| 6.1.2 | Aerodynamic coefficients | - |
| 6.1.3 | Boundary layer and wake quantities | - |
| 6.1.4 | Repeatability | - |
| 6.1.5 | Additional remarks | Data was recorded with 12 bits resolution covering expected range of values. |

### 6.2 Wall interference corrections

### 6.3 Data presentation

| | | |
|---|---|---|
| 6.3.1 | Aerodynamic coefficients | - |
| 6.3.2 | Surface pressure | $C_p$ on wing, stabilizer and fuselage (Table IV.) |
| | Skin friction | $C_f$ on wing (Table V.) |
| 6.3.3 | Flow conditions | rms of $\alpha$, nz etc. are included and bounds given for the data. (Table I.) |
| 6.3.4 | Boundary layer data | Partly analysed, only sample data set included, Table VI. |
| 6.3.5 | Flow conditions for boundary layer and/for wake data | - |
| 6.3.6 | Wall interference corrections included? | - |
| 6.3.7 | Aeroelastic corrections included? | Yes. |
| 6.3.8 | Other corrections? | - |
| 6.3.9 | Additional remarks | A computer-based data collection with FORTRAN-routines for data search is under development, and may be available. |

## 7. References


1 Bertelrud, A.: Instrumentation for Measurement of Flow Properties on a Swept Wing in Flight. DGLR Vortrag 81-034 (1981).

2 Bertelrud, A.: Static-Pressure and Skin-Friction Distributions on a Swept Wing in Flight at Mach Numbers from 0.27 to 0.9. AIAA Paper 81-1216 (1981).

3 Bertelrud, A.: Steady and Unsteady Effects on the Aerodynamic Flow on a Swept Wing in Flight. AIAA Paper 81-2418 (1981).

4 Bertelrud, A. & Nordström, J.: Experimental and Computational Investigation of the Flow in the Leading Edge Region of a Swept Wing. AIAA Paper 83-1762 (1983).

5 Bertelrud, A.: Experimental and Computational Investigation of a Swept Wing Flow at Subsonic Speeds. Journal of Aircraft, Vol. 16, No. 11, pp. 742-748 (1979).

## 8. List of symbols

| | |
|---|---|
| $A_R, A_o, A_1, A_2, A_3$ | coefficients in the polynomial describing NACA 64A010 |
| $a = \sqrt{\gamma\ p/\rho}$ | speed of sound |
| $B$ | wing span: B=13 m, or stabilizer span $B_S$=5.4 m |
| $C_i$ | local chord |
| $C_{i-T}$ | local chord, imaginary tapezoidal wing, $C_{i-T}=C_i$ for $\eta<0.929$ |
| $C_{25}$ | local chord, normal to 25% chord line. ($C_{25}$ is distance from L.E. to T.E. of line normal to 25% chord line.) |
| $C_p = \frac{p_{loc} - p_{ref}}{\gamma/2\ p_{ref}\ M^2}$ | static pressure coefficient |
| $C_f = \frac{\tau_w}{\gamma/2\ p_{loc}\ M^2_{loc}}$ | skin friction coefficient |
| $C_L$ | lift coefficient |
| $H$ | flight altitude |
| $H = \delta^*/\theta$ | shape factor |
| L | lower |
| LE | leading edge |
| M | Mach number (reference) |
| MAC | Mean Average Chord = 3.14 m |
| $n_Z$ | acceleration, z-direction, close to centre of gravity |
| $n_{Z_{TIP}}$ | acceleration, z-direction, at $\eta \sim 0.9$ |
| $p$ | pressure; absolute units |
| $Re/m = (M \cdot a)/\nu$ | unit Reynolds number |
| $Re_{MAC} = (M \cdot a \cdot MAC)/\nu$ | |
| $s$ | coordinate along surface |
| $s_N$ | coordinate along surface, normal to leading edge |
| T | tip |
| $T_o$ | total temperature |
| TE | trailing edge |
| U | upper |
| $V_i$ | indicated air speed |
| $x$ | longitudinal coordinate |
| $x_{1-TE}$ | -"- -"- of trailing edge |
| $x''$ | -"- -"- , stabilizer. Definition: Table III.6 |
| $x'$ | -"- -"- , wing tip. Definition: Table III.4 |
| $x_1$, $x_3$ | -"- -"- ($x_3=x_1-1.70$ [m]) Definition: Figure 4 |
| $x_{25}$ | coordinate, See Definition Table II.1 |
| $y$ | lateral coordinate |
| $y'$ | " " , wing tip (Table III.4) |
| $y''$ | " " , stabilizer (Table III.7) |
| $y_{25}$ | coordinate. See Definition Table II.1 |
| $z$ | vertical coordinate |
| $z''$ | " " , stabilizer (Table III.6) |
| $\alpha$ | angle of attack |
| $\gamma = 1.4$ | ratio of specific heats |
| $\delta$ | boundary layer thickness |
| $\delta_a$ | aileron deflection angle |
| $\eta = y/(B/2)$ | non-dimensional spanwise position |
| $\mu$ | dynamic viscosity |
| $\nu = \mu/\rho$ | kinematic viscosity |
| $\xi = x/C_i$ | non-dimensional chordwise position |
| $\rho$ | density |
| $\omega_x$ | angular velocity, around x-axis |
| $\omega_y$ | -"- -"- , -"- y-axis |
| $\omega_z$ | -"- -"- , -"- z-axis |

**Subscripts:**

| | |
|---|---|
| e | external (local) value |
| loc | local value |
| ref | reference value |
| s | stabilizer |
| x | x-direction |
| y | y-direction |
| z | z-direction |

TABLES



Table 1. Flight conditions and typical root-mean-squares of fluctuations for certain parameters.

| CASE | A | B | C | D |
|---|---|---|---|---|
| M | 0.89 | 0.885 | 0.80 | 0.40 |
| H [km] | 10 | 7 | 7 | 7 |
| $C_L$ | 0.177 | 0.116 | 0.143 | 0.570 |
| $\alpha$ [deg] | 2.38 | 1.61 | 1.99 | 8.78 |
| $Re/m \times 10^{-6}$ | 7.59 | 10.49 | 9.43 | 4.72 |
| $Re_{MAC} \times 10^{-6}$ | 23.8 | 32.9 | 29.6 | 14.8 |
| $T_o$ [°K] | 258 | 280 | 274 | 250 |
| RMS fluctuations: | | | | |
| $V_i$ [km/h] | 0.30 | 0.51 | 0.45 | 0.22 |
| H [m] | 3.5 | 2.9 | 3.2 | 1.6 |
| $\alpha$ [deg] | 0.010 | 0.012 | 0.018 | 0.022 |
| $n_Z$ | 0.009 | 0.009 | 0.007 | 0.004 |
| $n_{Z_{TIP}}$ | 0.010 | 0.011 | 0.008 | 0.005 |
| $n_{Z_{TIP}} - n_Z$ | 0.004 | 0.005 | 0.004 | 0.003 |
| $\delta_a$ [deg] | 0.019 | 0.011 | 0.009 | 0.020 |
| $\omega_x$ [deg/sec] | 0.130 | 0.091 | 0.088 | 0.123 |
| $\omega_y$ [deg/sec] | 0.029 | 0.015 | 0.020 | 0.025 |
| $\omega_z$ [deg/sec] | 0.017 | 0.018 | 0.013 | 0.022 |

Note:
- $T_o$ given as ICAO standard atmosphere
- 10 Hz filters applied before digitizing

Table II.1 Main wing.
Curvefit NACA 64A010 normal to 25% chord line.

$$\frac{Z_{25}}{C_{25}} = A_R\sqrt{\frac{X_{25}}{C_{25}}} + A_1\left(\frac{X_{25}}{C_{25}}\right) + A_2\left(\frac{X_{25}}{C_{25}}\right)^2 + A_3\left(\frac{X_{25}}{C_{25}}\right)^3$$

where the coefficients are given by:

$0 < X_{25}/C_{25} < 0.1$ $A_R = 0.11721775$ ; $A_1 = -0.043076644$ ; $A_2 = -0.034387405$
$0.1 < X_{25}/C_{25} < 0.4$ $A_o = 0.0131053171$ ; $A_1 = 0.23071064$ ; $A_2 = -0.472503881$ ; $A_3 = 0.316041921$
$0.4 < X_{25}/C_{25} < 1$ $A_o = 0.0104562228$ ; $A_1 = 0.236135343$ ; $A_2 = -0.4078524$ ; $A_3 = 0.161637864$

Profile coordinates in x-direction for $\eta$=0.159-0.929, based on given polynomials

| $\xi$ | $Z/C_i$ | $\xi$ | $Z/C_i$ |
|---|---|---|---|
| .001 | .00317 | .280 | .04147 |
| .002 | .00446 | .320 | .04278 |
| .004 | .00627 | .360 | .04358 |
| .006 | .00764 | .400 | .04443 |
| .008 | .00879 | .440 | .04408 |
| .010 | .00979 | .480 | .04316 |
| .020 | .01362 | .520 | .04170 |
| .030 | .01648 | .560 | .03975 |
| .040 | .01881 | .600 | .03734 |
| .060 | .02259 | .640 | .03452 |
| .080 | .02562 | .680 | .03135 |
| .100 | .02743 | .720 | .02786 |
| .120 | .02975 | .760 | .02413 |
| .140 | .03186 | .800 | .02021 |
| .160 | .03377 | .840 | .01617 |
| .180 | .03549 | .880 | .01208 |
| .200 | .03703 | .920 | .00801 |
| .240 | .03957 | .960 | .00405 |
| | | 1.000 | .00029 |

Note: Physical trailing edge thickness: $Z/C_i = 0.0016$

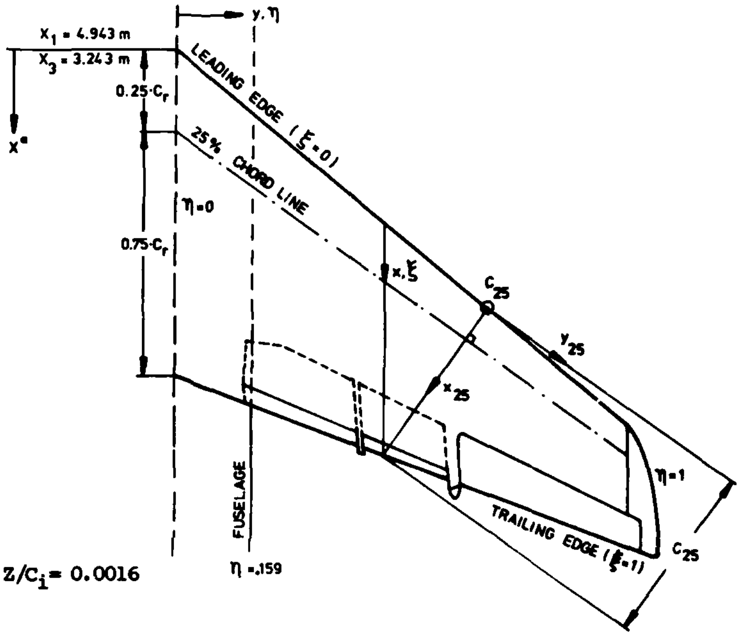
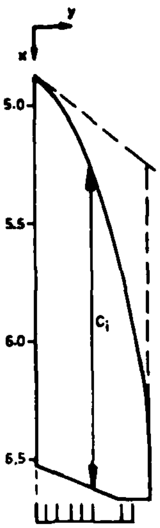



Table II.2 Wing tip geometry. z[m]

| $x/C_i$ \ $\eta$ | .929 | .936 | .946 | .952 | .960 | .980 | .987 | .991 |
|---|---|---|---|---|---|---|---|---|
| $C_i$ | 1.634 | 1.605 | 1.531 | 1.463 | 1.361 | 1.017 | 0.798 | 0.644 |
| $x^*_{TE}$[m] | 6.537 | 6.555 | 6.578 | 6.594 | 6.613 | 6.660 | 6.668 | 6.668 |
| .0000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 | .00000 |
| .0050 | .01142 | .01123 | .01125 | .00980 | .00966 | .00445 | .00536 | .01688 |
| .0075 | .01389 | .01365 | .01362 | .01194 | .01169 | .00572 | .00656 | .01948 |
| .0125 | .01773 | .01741 | .01727 | .01528 | .01482 | .00792 | .00847 | .02278 |
| .0250 | .02455 | .02411 | .02365 | .02129 | .02030 | .01240 | .01193 | .02651 |
| .0500 | .03372 | .03316 | .03206 | .02952 | .02763 | .01928 | .01671 | .02779 |
| .0750 | .04040 | .03981 | .03815 | .03564 | .03303 | .02456 | .02024 | .02685 |
| .1000 | .04579 | .04522 | .04307 | .04067 | .03750 | .02873 | .02309 | .02559 |
| .1500 | .05428 | .05383 | .05096 | .04870 | .04484 | .03478 | .02752 | .02997 |
| .2000 | .06073 | .06043 | .05711 | .05489 | .05068 | .03879 | .03085 | .02401 |
| .3000 | .06918 | .06903 | .06541 | .06296 | .05860 | .04344 | .03522 | .02710 |
| .4000 | .07226 | .07202 | .06858 | .06580 | .06153 | .04550 | .03703 | .03031 |
| .5000 | .06992 | .06954 | .06647 | .06360 | .05952 | .04506 | .03632 | .03097 |
| .6000 | .06215 | .06189 | .05919 | .05666 | .05304 | .04110 | .03314 | .02888 |
| .7000 | .04946 | .04979 | .04742 | .04568 | .04298 | .03300 | .02801 | .02542 |
| .8000 | .03326 | .03448 | .03248 | .03177 | .03045 | .02191 | .02231 | .02247 |
| .9000 | .01628 | .01776 | .01635 | .01654 | .01657 | .01219 | .01866 | .02114 |
| 1.000 | .00215 | .00201 | .00175 | .00209 | .00223 | .01276 | .02125 | .02048 |
| $C_{i-T}$ | 1.637 | 1.616 | 1.587 | 1.570 | 1.546 | 1.488 | 1.467 | 1.456 |




Definition profile position

$C_{i-T}$ is local chord for trapezoidal wing.

Note: Z coordinate given in unit: meters.

Table III.1 Pressure taps. Leading edge stations: main wing.

| | Station 1 | | | | Station 2 | | | | Station 3 | | | | Station 4 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $S_N$ mm | S mm | $x/C_i$ | $z/C_i$ | $S_N$ mm | S mm | $x/C_i$ | $z/C_i$ | $S_N$ mm | S mm | $x/C_i$ | $z/C_i$ | $S_N$ mm | S mm | $x/C_i$ | $z/C_i$ |
| TAP | | $\eta$=.904 | $C_i$=1.71 m | | | $\eta$=.774 | $C_i$=2.09 m | | | $\eta$=.621 | $C_i$=2.53 m | | | $\eta$=.501 | $C_i$=2.87 m | |
| 18 | | | | | -255 | -313 | .1430 | -.0323 | | | | | | | | |
| 17 | | | | | -222 | -273 | .1240 | -.0304 | | | | | | | | |
| 16 | | | | | -190 | -233 | .1050 | -.0282 | | | | | | | | |
| 15 | | | | | -157 | -193 | .0860 | -.0259 | | | | | | | | |
| 14 | | | | | -125 | -153 | .0665 | -.0237 | | | | | | | | |
| 1 | -96 | -120 | .0629 | -.0226 | -93 | -112.5 | .0478 | -.0198 | -103 | -125.5 | .0443 | -.0191 | -116 | -143 | .0437 | -.0190 |
| 2 | -59 | -73 | .0357 | -.0174 | -62.5 | -74.5 | .0298 | -.0159 | -71 | -85 | .0284 | -.0154 | -76 | -92 | .0262 | -.0149 |
| 3 | -36 | -45 | .0196 | -.0129 | -39 | -44.5 | .0164 | -.0119 | -44.5 | -51.5 | .0159 | -.0115 | -45 | -53 | .0134 | -.0108 |
| 4 | -21 | -25.5 | .0094 | -.0096 | -21 | -23 | .0070 | -.0079 | -23 | -25 | .0064 | -.0074 | -22.5 | -25 | .0049 | -.0069 |
| 5 | -9 | -10 | .0023 | -.0041 | -8.5 | -9.5 | .0018 | -.0041 | -8.5 | -9 | .0015 | -.0032 | -10 | -10.5 | .0012 | -.0031 |
| 6 | 0 | 0 | .0000 | .0002 | 0 | 0 | .0000 | .0000 | 0 | 0 | .0000 | -.0001 | 0 | 0 | .0000 | .0001 |
| 7 | 9 | 10 | .0026 | .0046 | 8 | 8 | .0014 | .0041 | 9.5 | 10 | .0011 | .0035 | 11 | 11.5 | .0013 | .0038 |
| 8 | 21 | 25.5 | .0092 | .0096 | 17 | 19 | .0048 | .0072 | 20.5 | 22 | .0042 | .0068 | 24 | 27 | .0048 | .0070 |
| 9 | 34 | 42 | .0175 | .0127 | 28 | 32 | .0104 | .0101 | 33.5 | 37.5 | .0092 | .0098 | 42 | 48 | .0148 | .0106 |
| 10 | 56 | 69.5 | .0333 | .0172 | 44 | 52 | .0194 | .0134 | 54 | 62.5 | .0184 | .0133 | 62 | 74 | .0198 | .0136 |
| 11 | 79 | 98 | .0500 | .0210 | 66 | 79 | .0316 | .0168 | 82.5 | 99 | .0324 | .0172 | 101 | 123 | .0363 | .0179 |
| 12 | 104 | 130 | .0680 | .0240 | 97.5 | 119 | .0506 | .0207 | 119 | 144.5 | .0500 | .0206 | 136.6 | 169 | .0520 | .0210 |
| 13 | 150 | 189 | .1022 | .0286 | 157 | 195 | .0863 | .0263 | 181 | 213.5 | .0817 | .0256 | 180.5 | 225 | .0711 | .0241 |

| | Station 5 | | | | Station 6 | | | | Station 7 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $S_N$ mm | S mm | $x/C_i$ | $z/C_i$ | $S_N$ mm | S mm | $x/C_i$ | $z/C_i$ | $S_N$ mm | S mm | $x/C_i$ | $z/C_i$ |
| TAP | | $\eta$=.389 | $C_i$=3.19 m | | | $\eta$=.286 | $C_i$=3.50 m | | | $\eta$=.179 | $C_i$=3.82 m | |
| 18 | -388 | -486 | .1450 | -.0326 | | | | | | | | |
| 17 | -336 | -420 | .1245 | -.0305 | | | | | | | | |
| 16 | -283 | -354 | .1040 | -.0281 | | | | | | | | |
| 15 | -231 | -288 | .0835 | -.0259 | | | | | | | | |
| 14 | -178 | -221 | .0630 | -.0234 | | | | | | | | |
| 1 | -125.5 | -155 | .0428 | -.0189 | -136.5 | -167 | .0418 | -.0186 | -143 | -174 | .0398 | -.0181 |
| 2 | -80.5 | -98 | .0251 | -.0147 | -87 | -104 | .0242 | -.0144 | -91.5 | -109 | .0233 | -.0139 |
| 3 | -50 | -59 | .0137 | -.0112 | -54 | -62 | .0126 | -.0107 | -55.5 | -64 | .0123 | -.0103 |
| 4 | -24.5 | -26.5 | .0046 | -.0068 | -27 | -29 | .0042 | -.0065 | -27.5 | -30 | .0045 | -.0063 |
| 5 | -9 | -9.5 | .0007 | -.0028 | -11 | -11.5 | .0010 | -.0032 | -11.5 | -12 | .0010 | -.0029 |
| 6 | 0 | 0 | .0000 | .0000 | 0 | 0 | .0000 | .0000 | 0 | 0 | .0000 | .0001 |
| 7 | 10.5 | 11 | .0012 | .0032 | 10.5 | 11 | .0008 | .0031 | 12 | 12.5 | .0009 | .0030 |
| 8 | 22.5 | 24 | .0040 | .0062 | 21.5 | 23.5 | .0033 | .0058 | 24 | 26 | .0031 | .0056 |
| 9 | 38 | 42. | .0091 | .0092 | 39 | 44 | .0081 | .0088 | 42.5 | 47 | .0080 | .0087 |
| 10 | 59 | 68.5 | .0164 | .0121 | 61.5 | 72 | .0155 | .0118 | 66 | 76 | .0148 | .0116 |
| 11 | 88 | 105.5 | .0274 | .0154 | 79.5 | 95 | .0216 | .0138 | 102.5 | 122 | .0265 | .0152 |
| 12 | 125.5 | 154.5 | .0418 | .0188 | 119 | 146 | .0357 | .0174 | 148 | 181 | .0413 | .0187 |
| 13 | 186 | 231 | .0657 | .0231 | 190 | 236 | .0613 | .0224 | 196.5 | 244 | .0576 | .0217 |

Table III.2 Static pressure taps, *instrumented segment.*

| ORIFICE | $S_N$ [mm] | S [mm] | $x/C_i$ | $z/C_i$ | η |
|---|---|---|---|---|---|
| 1 | -104.3 | -123.2 | .0580 | .0208 | .834 |
| 2 | -72.4 | -85.9 | .0390 | .0187 | .836 |
| 3 | -47.4 | -54.2 | .0230 | .0146 | .837 |
| 4 | -34.2 | -39.2 | .0155 | .0121 | .838 |
| 5 | -25.1 | -27.9 | .0100 | .0099 | .839 |
| 6 | -19.7 | -20.9 | .0068 | .0082 | .839 |
| 7 | -14.2 | -15.2 | .0045 | .0067 | .840 |
| 8 | -9. | -10.6 | .0030 | .0055 | .840 |
| 9 | -5.6 | -6.1 | .0018 | .0043 | .840 |
| 10 | -3.5 | -3.7 | .0012 | .0036 | .840 |
| 11 | 0 | 0.0 | .0000 | .0000 | .840 |
| 12 | 3.5 | 3.7 | .0012 | .0036 | .840 |
| 13 | 5.8 | 6.3 | .0018 | .0043 | .840 |
| 14 | 9.7 | 10.5 | .0030 | .0055 | .840 |
| 15 | 13.7 | 14.7 | .0043 | .0065 | .840 |
| 16 | 19.0 | 20.3 | .0065 | .0080 | .839 |
| 17 | 23.6 | 25.9 | .0091 | .0094 | .839 |
| 18 | 30.2 | 34.0 | .0130 | .0112 | .839 |
| 19 | 37.6 | 42.6 | .0172 | .0128 | .838 |
| 20 | 53.4 | 62.3 | .0267 | .0158 | .837 |
| 21 | 73.1 | 86.0 | .0391 | .0188 | .836 |
| 22 | 102.8 | 121.4 | .0575 | .0206 | .834 |
| 23 | 135.3 | 162.1 | .0778 | .0254 | .832 |
| 24 | 169.6 | 204.9 | .0995 | .0278 | .829 |
| 25 | 221.3 | 270.5 | .1325 | .0311 | .825 |
| 26 | 310.3 | 377.5 | .1860 | .0361 | .820 |
| 27 | 370.3 | 451.7 | .2225 | .0389 | .816 |
| 28 | 448.3 | 548.0 | .2690 | .0414 | .810 |
| 29 | 548.8 | 677.9 | .3305 | .0433 | .802 |
| 30 | 649.3 | 808.6 | .3910 | .0445 | .794 |
| 31 | 749.3 | 933.5 | .4480 | .0438 | .787 |

Table III.3 Pressure taps, aileron.

| ORIFICE | ξ | η | SIDE |
|---|---|---|---|
| 401 | .729 | 0.770 | P |
| 402 | .865 | " | P |
| 404 | 1.000 | " | TE |
| 406 | .932 | " | S |
| 407 | .865 | " | S |
| 408 | .826 | " | S |
| 409 | .779 | " | S |
| 410 | .726 | " | S |
| 901 | .698 | 0.903 | P |
| 902 | .904 | " | P |
| 903 | .975 | " | P |
| 904 | 1.000 | " | TE |
| 905 | .975 | " | S |
| 906 | .904 | " | S |
| 907 | .849 | " | S |
| 908 | .698 | " | S |

Local chords: $\eta = 0.770$ $C_i = 2.075$ m
$\eta = 0.903$ $C_i = 1.713$ m

Note: Physical aileron starts at $\xi = 0.745$

Table III.4 Pressure taps, wing tip

$\xi = \frac{x - x'}{C_i}$  $C_i = -2.910 \cdot \eta + 4.340$  $x' = 0.809 \cdot y'$

| ORIFICE | $\xi$ | $\eta$ | x [mm] | y' [mm] | $C_{i-T}$ | x' [mm] | SIDE U,L | ORIFICE | $\xi$ | $\eta$ | x [mm] | y' [mm] | $C_{i-T}$ | x' [mm] | SIDE U,L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .101 | .9428 | 232 | 87.9 | 1.596 | 71 | U | 31 | .396 | .9719 | 822 | 277.5 | 1.512 | 244 | L |
| 2 | .108 | .9587 | 322 | 191.3 | 1.550 | 155 | U | 32 | .395 | .9644 | 791 | 228.9 | 1.534 | 185 | L |
| 3 | .108 | .9559 | 308 | 173.4 | 1.558 | 140 | L | 33 | .395 | .9566 | 759 | 178.2 | 1.556 | 144 | L |
| 4 | .100 | .9426 | 229 | 86.7 | 1.596 | 70 | L | 34 | .490 | .9425 | 853 | 86.4 | 1.597 | 70 | U |
| 5 | .201 | .9426 | 390 | 86.7 | 1.596 | 70 | U | 35 | .491 | .9559 | 905 | 173.1 | 1.558 | 140 | U |
| 6 | .204 | .9564 | 460 | 176.7 | 1.557 | 143 | U | 36 | .491 | .9716 | 966 | 275.2 | 1.513 | 223 | U |
| 7 | .204 | .9566 | 462 | 177.7 | 1.557 | 144 | L | 37 | .492 | .9832 | 1012 | 350.5 | 1.479 | 284 | U |
| 8 | .202 | .9426 | 392 | 87.0 | 1.596 | 70 | L | 38 | .496 | .9882 | 1036 | 382.2 | 1.464 | 310 | U |
| 9 | .248 | .9426 | 466 | 86.8 | 1.596 | 70 | U | 39 | .500 | .9893 | 1046 | 390.3 | 1.461 | 316 | L |
| 10 | .298 | .9425 | 545 | 86.6 | 1.596 | 70 | U | 40 | .496 | .9882 | 1036 | 383.0 | 1.464 | 310 | L |
| 11 | .297 | .9562 | 605 | 175. | 1.557 | 142 | U | 41 | .496 | .9867 | 1030 | 373.8 | 1.469 | 302 | L |
| 12 | .299 | .9564 | 608 | 176.3 | 1.557 | 143 | L | 42 | .494 | .9837 | 1016 | 353.9 | 1.477 | 286 | L |
| 13 | .298 | .9425 | 545 | 86.5 | 1.596 | 70 | L | 43 | .493 | .9794 | 998 | 325.8 | 1.490 | 264 | L |
| 14 | .394 | .9425 | 699 | 86.4 | 1.596 | 70 | U | 44 | .492 | .9716 | 968 | 275.3 | 1.513 | 223 | L |
| 15 | .394 | .9565 | 757 | 177.1 | 1.557 | 143 | U | 45 | .492 | .9637 | 936 | 224.3 | 1.536 | 181 | L |
| 16 | .393 | .9720 | 819 | 277.7 | 1.511 | 225 | U | 46 | .491 | .9559 | 905 | 173.5 | 1.558 | 140 | L |
| 17 | .393 | .9770 | 840 | 310.7 | 1.497 | 251 | U | 47 | .490 | .9427 | 854 | 87.6 | 1.597 | 71 | L |
| 18 | .397 | .9818 | 865 | 341.6 | 1.483 | 276 | U | 48 | .594 | .9425 | 1018 | 86.4 | 1.597 | 70 | U |
| 19 | .399 | .9838 | 876 | 355.0 | 1.477 | 287 | U | 49 | .594 | .9558 | 1066 | 172.8 | 1.558 | 140 | U |
| 20 | .399 | .9846 | 879 | 359.7 | 1.475 | 291 | U | 50 | .603 | .9923 | 1206 | 409.7 | 1.452 | 331 | L |
| 21 | .402 | .9850 | 885 | 362.4 | 1.474 | 293 | L | 51 | .601 | .9554 | 1074 | 169.9 | 1.560 | 137 | L |
| 22 | .398 | .9846 | 878 | 359.6 | 1.475 | 291 | L | 52 | .596 | .9426 | 1022 | 86.9 | 1.597 | 70 | L |
| 23 | .397 | .9838 | 874 | 354.8 | 1.477 | 287 | L | 53 | .692 | .9425 | 1175 | 86.4 | 1.597 | 70 | U |
| 24 | .397 | .9830 | 870 | 319.6 | 1.479 | 283 | L | 54 | .708 | .9480 | 1218 | 122.1 | 1.581 | 39 | U |
| 25 | .396 | .9818 | 864 | 341.7 | 1.483 | 276 | L | 55 | .696 | .9939 | 1348 | 420.5 | 1.448 | 340 | L |
| 26 | .397 | .9806 | 860 | 333.9 | 1.486 | 270 | L | 56 | .697 | .9563 | 1228 | 175.8 | 1.557 | 142 | L |
| 27 | .397 | .9793 | 854 | 325.6 | 1.490 | 263 | L | 57 | .699 | .9427 | 1187 | 87.9 | 1.597 | 71 | L |
| 28 | .396 | .9782 | 849 | 318.6 | 1.493 | 258 | L | 58 | .796 | .9951 | 1495 | 428.1 | 1.444 | 346 | L |
| 29 | .395 | .9771 | 844 | 311.8 | 1.497 | 252 | L | 59 | .893 | .9957 | 1638 | 432.2 | 1.442 | 350 | L |
| 30 | .396 | .9715 | 833 | 294.4 | 1.504 | 238 | L | 60 | .210 | .9709 | 538 | 271.0 | 1.515 | 219 | U |
| | | | | | | | | 61 | .256 | .9753 | 626 | 299.2 | 1.502 | 242 | U |

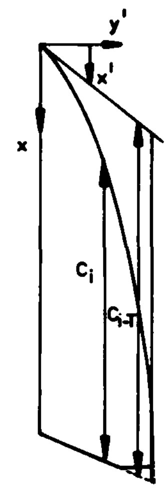
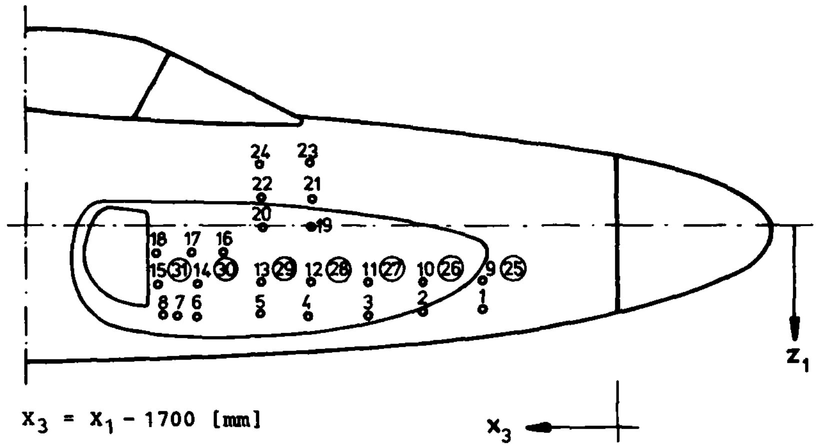


Table III.5 Pressure taps on fuselage.

| TAP | $X_3$ [mm] | $Z_1$ [mm] |
|---|---|---|
| 1 | 801 | 513 |
| 2 | 1170 | 530 |
| 3 | 1506 | 542 |
| 4 | 1830 | 541 |
| 5 | 2130 | 539 |
| 6 | 2504 | 538 |
| 7 | 2626 | 534 |
| 8 | 2695 | 522 |
| 9 | 800 | 341 |
| 10 | 1150 | 342 |
| 11 | 1495 | 340 |
| 12 | 1834 | 341 |
| 13 | 2137 | 341 |
| 14 | 2526 | 339 |
| 15 | 2766 | 338 |
| 16 | 2351 | 169 |
| 17 | 2542 | 169 |
| 18 | 2769 | 168 |
| 19 | 1834 | 15 |
| 20 | 2134 | 16 |
| 21 | 1835 | -179 |
| 22 | 2135 | -180 |
| 23 | 1834 | -359 |
| 24 | 2134 | -356 |
| 25 | 802 | 341 |
| 26 | 1164 | 341 |
| 27 | 1502 | 342 |
| 28 | 1834 | 340 |
| 29 | 2139 | 341 |
| 30 | 2519 | 342 |
| 31 | 2759 | 340 |



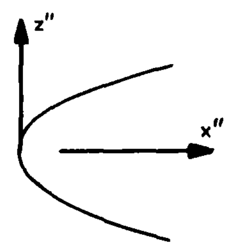

$X_3 = X_1 - 1700$ [mm]

Starboard side: Taps 1 - 24

Port side: Taps 25 - 31

Table III.6 Pressure taps. Stabilizer, leading edge.

| | STATION 11 | STATION 12 | STATION 13 |
|---|---|---|---|
| | $\eta_s$ = 0.726 | 0.529 | 0.332 |
| ORIFICE | x"/z" | x"/z" | x"/z" |
| 1 | 221.0/-41.8 | 285.0/-54.0 | - |
| 2 | 84.0/-26.0 | 177.0/-44.0 | 148.0/-45.0 |
| 3 | 67.5/-23.8 | 134.5/-39.2 | 43.4/-25.5 |
| 4 | 26.0/-15.0 | 65.0/-28.0 | 7.3/-11.2 |
| 5 | 5.0/ -6.8 | 36.0/-21.6 | 1.0/ -3.8 |
| 6 | 0.0/ 0.6 | 18.5/-15.8 | 0.0/ 1.5 |
| 7 | 1.2/ 4.2 | 7.5/-10.6 | 1.0/ 4.8 |
| 8 | 2.8/ 6.0 | 1.4/ -4.8 | 4.0/ 8.8 |
| 9 | 6.5/ 9.0 | 0.0/ 0.2 | 9.0/ 12.5 |
| 10 | 11.5/ 11.6 | 1.2/ 3.5 | 36.0/ 24.0 |
| 11 | 28.5/ 17.0 | 3.1/ 6.4 | 183.0/ 48.5 |
| 12 | 61.5/ 23.8 | 7.5/ 9.8 | 355.0/ 64.0 |
| 13 | 121.0/ 31.8 | 14.6/ 13.2 | |
| 14 | 231.0/ 42.0 | 23.8/ 16.6 | |
| 15 | | 36.4/ 20.5 | |
| 16 | | 54.8/ 24.8 | |
| 17 | | 66.0/ 27.4 | |
| 18 | | 78.5/ 30.0 | |
| 19 | | 155.5/ 41.2 | |
| 20 | | 215.0/ 47.5 | |
| 21 | | 288.0/ 53.5 | |



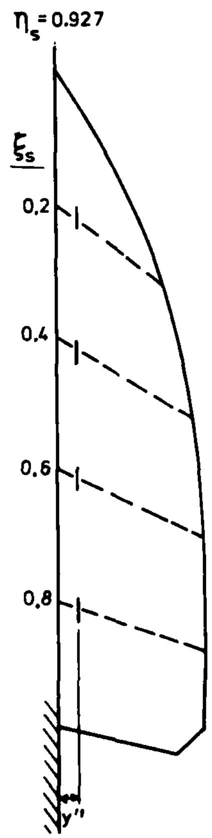

x" and z" in [mm]

Stabilizer profile: NACA64A009 normal to 25% chord line.
(See Figure 1 for dimensions and location)

Table III.7 Pressure taps, stabilizer tip.

$$\eta_s = 0.9268 + \frac{y''}{2.700}$$

| ORIFICE | $\xi_s$ | $\eta_s$ | SIDE | y" [mm] | z" [mm] | ORIFICE | $\xi_s$ | $\eta_s$ | SIDE | y" [mm] | z" [mm] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.05 | .9383 | T | 31 | - | 26 | 0.40 | .9811 | L | 146.5 | -203 |
| 2 | 0.10 | .9501 | T | 63 | - | 27 | 0.40 | .9738 | L | 127 | -266.5 |
| 3 | 0.15 | .9629 | T | 97.5 | - | 28 | 0.40 | .9609 | L | 92 | -328.5 |
| 4 | 0.20 | .9753 | T | 131 | - | 29 | 0.40 | .9453 | L | 50 | -369 |
| 5 | 0.30 | .9824 | T | 150 | - | 30 | 0.60 | .9453 | U | 50 | -391.5 |
| 6 | 0.40 | .9886 | T | 167 | 0 | 31 | 0.60 | .9649 | U | 103 | |
| 7 | 0.50 | .9922 | T | 176.5 | - | 32 | 0.60 | .9794 | U | 142 | |
| 8 | 0.60 | .9955 | T | 185.5 | - | 33 | 0.60 | .9875 | U | 164 | |
| 9 | 0.72 | .9977 | T | 191.5 | - | 34 | 0.60 | .9924 | U | 177 | |
| 10 | 0.80 | .9993 | T | 196 | - | 35 | 0.60 | .9946 | U | 183 | |
| 11 | 0.87 | 1.0000 | T | 197.5 | - | 36 | 0.60 | .9949 | U | 184 | |
| 12 | 0.20 | .9453 | U | 50 | - | 37 | 0.60 | .9949 | L | 184 | |
| 13 | 0.20 | .9675 | U | 110 | - | 38 | 0.60 | .9946 | L | 183 | |
| 14 | 0.20 | .9675 | L | 110 | - | 39 | 0.60 | .9924 | L | 177 | |
| 15 | 0.20 | .9453 | L | 50 | - | 40 | 0.60 | .9875 | L | 164 | |
| 16 | 0.40 | .9453 | U | 50 | 369 | 41 | 0.60 | .9794 | L | 142 | |
| 17 | 0.40 | .9609 | U | 92 | 328.5 | 42 | 0.60 | .9649 | L | 103 | |
| 18 | 0.40 | .9738 | U | 127 | 266.5 | 43 | 0.60 | .9453 | L | 50 | |
| 19 | 0.40 | .9811 | U | 146.5 | 203 | 44 | 0.80 | .9453 | U | 50 | |
| 20 | 0.40 | .9853 | U | 158 | 141.5 | 45 | 0.80 | .9731 | U | 125 | |
| 21 | 0.40 | .9875 | U | 164 | 83.5 | 46 | 0.80 | .9905 | U | 172 | |
| 22 | 0.40 | .9883 | U | 166 | 39.5 | 47 | 0.80 | .9972 | U | 190 | |
| 23 | 0.40 | .9883 | L | 166 | -39.5 | 48 | 0.80 | .9972 | L | 190 | |
| 24 | 0.40 | .9875 | L | 164 | -83.5 | 49 | 0.80 | .9905 | L | 172 | |
| 25 | 0.40 | .9853 | L | 158 | -141.5 | 50 | 0.80 | .9731 | L | 125 | |
| | | | | | | 51 | 0.80 | .9453 | L | 50 | |



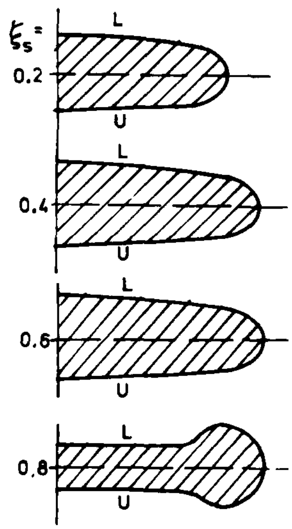



Table IV.0 Static pressure coefficient $C_p$ on main wing. TEST CASE A
H = 10 km ; M = 0.89 SUCTION SIDE

| ξ \ η | .188 | .241 | .294 | .347 | .400 | .506 | .559 | .612 | .665 | .718 | .770 | .823 | .903 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| .05 | | | | | | | | | | | | | |
| .10 | | | | | | | | | | | | | |
| .15 | | | | -.306 | -.353 | -.400 | -.468 | -.372 | -.674 | -.582 | -.288 | -.736 | -.259 |
| .20 | | -.220 | | | | | | | -.410 | | | | |
| .25 | .002 | -.297 | -.235 | -.309 | | | -.366 | -.522 | -.526 | -.430 | -.599 | -.634 | -.712 |
| .30 | .060 | -.243 | -.297 | -.333 | -.318 | -.336 | | | -.544 | -.496 | -.575 | | |
| .35 | | -.279 | -.353 | -.394 | -.347 | -.392 | -.476 | -.475 | | | | -.610 | -.560 |
| .40 | | -.342 | -.359 | -.415 | | | -.694 | -.574 | -.561 | -.575 | -.623 | | |
| .45 | | | | | -.502 | -.555 | | -.544 | | -.636 | -.699 | | -.536 |
| .50 | -.634 | -.373 | -.421 | -.468 | | | -.647 | -.657 | -.708 | -.624 | -.753 | -.228 | -.181 |
| .55 | -.442 | -.402 | -.468 | -.500 | -.546 | -.694 | -.649 | -.685 | | -.747 | -.700 | | -.200 |
| .60 | | | | | -.534 | -.655 | -.707 | -.232 | -.536 | -.204 | | -.137 | -.191 |
| .65 | -.520 | -.410 | -.451 | -.462 | -.473 | -.475 | -.312 | -.303 | | -.213 | -.113 | -.118 | -.112 |
| .70 | -.509 | -.445 | -.467 | -.460 | | -.153 | -.138 | | | | -.061 | | |
| .75 | -.299 | -.157 | -.132 | -.137 | -.155 | -.108 | -.092 | | | | | | |
| .80 | -.289 | -.204 | -.137 | -.113 | -.084 | -.037 | | | | | | | |
| .85 | | | | | -.022 | .009 | | | | | | | |
| .90 | -.125 | -.048 | .000 | .010 | | | | | | | | | |
| .95 | | | | | | | | | | | | | |

$C_p$ ; H = 10 km ; M = 0.89 PRESSURE SIDE

| ξ \ η | 0 | .241 | .347 | .453 | .559 | .612 | .665 | .744 | .770 | .903 |
|---|---|---|---|---|---|---|---|---|---|---|
| .05 | | | | | | | | | | |
| .10 | | | | | | | | | | |
| .15 | | | -.060 | -.062 | -.091 | | | | -.058 | -.097 |
| .20 | | -.098 | | | | | -.110 | | | -.157 |
| .25 | -.173 | -.099 | -.112 | | -.108 | | | | -.167 | -.213 |
| .30 | | -.129 | -.140 | -.136 | | | -.122 | -.258 | | |
| .35 | -.151 | -.156 | -.173 | | -.237 | | | | -.241 | |
| .40 | -.191 | -.184 | -.211 | | | | -.256 | | -.254 | -.219 |
| .45 | | | | | -.304 | | | | -.373 | |
| .50 | -.271 | -.146 | -.250 | | -.257 | -.260 | -.245 | -.261 | | -.177 |
| .55 | | | | -.257 | | | | | | |
| .60 | | | | -.193 | -.174 | -.151 | -.195 | -.174 | | |
| .65 | | | | -.165 | -.127 | | | | | |
| .70 | | | | -.085 | -.091 | | | -.092 | | |
| .75 | | | | | | | | | | |
| .80 | | | -.113 | | | | | | | |
| .85 | | | | | | | | | | |
| .90 | | | | | | | | | | |
| .95 | | | | | | | | | | |

Table IV.0 Static pressure coefficient $C_p$ on main wing. TEST CASE B.
$H = 7$ km ; $M = 0.89$ SUCTION SIDE

| $\xi \backslash \eta$ | .188 | .241 | .294 | .347 | .400 | .506 | .559 | .612 | .665 | .718 | .770 | .823 | .903 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| .05 | | | | | | | | | | | | | |
| .10 | | | | | | | | | | | | | |
| .15 | | | | −.220 | −.292 | −.335 | −.383 | −.322 | −.541 | −.492 | −.326 | −.487 | −.366 |
| .20 | .144 | −.180 | −.277 | −.311 | | | | −.405 | | −.469 | | −.357 | −.547 |
| .25 | −.052 | −.249 | −.272 | −.288 | | | | | −.531 | | −.420 | −.437 | −.677 |
| .30 | | | | | −.340 | −.350 | −.379 | −.425 | −.462 | −.426 | −.474 | −.529 | −.261 |
| .35 | | −.279 | −.319 | −.316 | | | −.509 | −.486 | | | | −.581 | |
| .40 | | −.308 | −.334 | −.404 | −.439 | −.486 | −.588 | −.556 | −.536 | −.544 | −.591 | | −.273 |
| .45 | | | | | −.448 | −.490 | | | | −.587 | −.655 | −.643 | −.272 |
| .50 | −.556 | −.430 | −.506 | −.385 | −.486 | −.648 | −.608 | −.608 | −.600 | −.504 | −.628 | −.209 | −.212 |
| .55 | −.410 | −.386 | −.423 | −.460 | −.460 | −.594 | −.615 | −.515 | | −.537 | | | −.180 |
| .60 | | | | | −.557 | −.559 | | −.677 | −.527 | −.363 | | −.186 | −.172 |
| .65 | −.510 | −.370 | −.432 | −.397 | −.450 | −.373 | −.432 | −.144 | | −.152 | −.149 | −.123 | −.070 |
| .70 | −.467 | −.420 | −.422 | −.402 | | −.168 | −.109 | | | | −.069 | | |
| .75 | −.382 | −.219 | −.177 | −.149 | −.157 | −.082 | −.098 | | | | | | |
| .80 | −.335 | −.235 | −.145 | −.109 | −.071 | −.029 | | | | | | | |
| .85 | | | | | −.016 | .022 | | | | | | | |
| .90 | −.123 | −.042 | .007 | .017 | | | | | | | | | |
| .95 | | | | | | | | | | | | | |

$C_p$ ; $H = 7$ km ; $M = 0.89$ PRESSURE SIDE

| $\xi \backslash \eta$ | 0 | .241 | .347 | .453 | .559 | .612 | .665 | .744 | .770 | .903 |
|---|---|---|---|---|---|---|---|---|---|---|
| .05 | | | | | | | | | | |
| .10 | | | | | | | | | | |
| .15 | | | | −.097 | −.152 | | | | −.137 | .062 |
| .20 | −.165 | −.082 | −.115 | | | | −.132 | −.177 | | −.213 |
| .25 | −.188 | −.126 | −.145 | | | | | | −.225 | −.238 |
| .30 | | | | −.186 | −.270 | −.221 | | | | −.202 |
| .35 | −.182 | −.178 | −.199 | | −.303 | | | | −.309 | |
| .40 | −.192 | −.219 | −.244 | −.312 | −.284 | | −.310 | | −.296 | |
| .45 | | | | −.312 | −.373 | | | | −.379 | |
| .50 | −.302 | −.199 | −.367 | −.340 | | −.335 | −.241 | −.284 | | −.168 |
| .55 | | | | −.258 | | | | | | |
| .60 | | | | −.232 | −.187 | −.187 | −.217 | −.193 | | |
| .65 | | | | −.175 | −.139 | | | | | |
| .70 | | | | −.095 | | −.104 | | −.091 | | |
| .75 | | | | | | | | | | |
| .80 | | | | | | | | | | |
| .85 | | | | | | | | | | |
| .90 | | | | | | | | | | |
| .95 | | | | | | | | | | |

Table IV.0. Static pressure coefficient $C_p$ on main wing. TEST CASE C.
H = 7 km ; M = 0.8 SUCTION SIDE

| $\xi \backslash \eta$ | .188 | .241 | .294 | .347 | .400 | .506 | .559 | .612 | .665 | .718 | .770 | .823 | .903 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| .05 | | | | | | | | | | | | | |
| .10 | | | | | | | | | | | | | |
| .15 | | | | -.316 | -.345 | -.381 | -.396 | -.408 | -.434 | -.427 | -.274 | -.430 | -.220 |
| .20 | -.113 | -.283 | -.332 | -.354 | | | -.422 | -.410 | -.408 | -.410 | -.469 | -.422 | -.410 |
| .25 | -.085 | -.299 | -.309 | -.328 | | | -.390 | -.389 | -.368 | -.360 | -.375 | -.389 | -.365 |
| .30 | -.263 | -.259 | -.279 | -.294 | -.338 | -.368 | -.381 | -.357 | -.352 | -.369 | -.404 | -.410 | -.340 |
| .35 | | -.311 | -.332 | -.351 | -.383 | -.400 | -.411 | | | | -.379 | -.399 | -.346 |
| .40 | | -.338 | -.355 | -.386 | -.398 | -.426 | -.434 | -.421 | -.412 | -.379 | -.402 | | -.352 |
| .45 | | | | | -.416 | -.417 | -.428 | | | -.390 | -.405 | | -.334 |
| .50 | -.442 | -.342 | -.356 | -.373 | -.356 | -.388 | -.410 | -.352 | -.311 | -.340 | -.346 | -.334 | -.293 |
| .55 | -.386 | -.325 | -.328 | -.329 | -.330 | -.313 | -.344 | -.306 | | -.284 | | -.270 | -.254 |
| .60 | -.379 | -.279 | -.277 | -.276 | -.280 | -.284 | -.387 | -.258 | -.264 | -.246 | | -.205 | -.234 |
| .65 | -.410 | -.284 | -.251 | -.231 | -.233 | -.212 | -.245 | -.196 | | -.185 | | -.164 | -.125 |
| .70 | -.362 | -.289 | -.241 | -.232 | | -.173 | -.164 | | | | -.104 | | |
| .75 | -.299 | -.184 | -.171 | -.163 | -.169 | -.136 | -.130 | | | | | | |
| .80 | -.229 | -.167 | -.117 | -.111 | -.102 | -.067 | | | | | | | |
| .85 | | | | | -.039 | -.003 | | | | | | | |
| .90 | -.112 | -.052 | -.006 | -.003 | | | | | | | | | |
| .95 | | | | | | | | | | | | | |

$C_p$ ; H = 7 km ; M = 0.8 PRESSURE SIDE

| $\xi \backslash \eta$ | 0 | .241 | .294 | .347 | .453 | .506 | .559 | .612 | .665 | .744 | .770 | .850 | .903 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| .05 | | | | | | | | | | | | | |
| .10 | | | | | | | | | | | | | |
| .15 | | | | | -.077 | | -.104 | | | | -.077 | | .101 |
| .20 | -.263 | -.082 | | -.102 | | | -.117 | -.129 | -.119 | | | -.141 | -.146 |
| .25 | -.288 | -.117 | | -.126 | | | -.165 | | | | -.159 | | -.162 |
| .30 | | -.123 | | -.119 | -.173 | | -.182 | | -.159 | -.226 | -.162 | -.205 | -.158 |
| .35 | -.243 | -.163 | | -.180 | | | -.212 | | | | -.206 | | |
| .40 | | -.188 | | -.210 | | | -.229 | | -.233 | | -.210 | | -.199 |
| .45 | | | | | | | -.221 | | | | -.241 | | -.193 |
| .50 | -.251 | -.162 | | -.216 | | | -.240 | -.223 | -.203 | | | -.179 | -.152 |
| .55 | | | | | | | -.217 | | | | | -.176 | |
| .60 | | | | | -.179 | | -.158 | -.159 | -.176 | -.173 | | | |
| .65 | | | | | -.147 | | -.122 | | | | | -.117 | |
| .70 | | | | | -.091 | -.084 | -.088 | | | | | | |
| .75 | | | | | | | | | | | | | |
| .80 | | | | | | | | | | | | | |
| .85 | | | | | | | | | | | | | |
| .90 | | | | | | | | | | | | | |
| .95 | | | | | | | | | | | | | |

Table IV.0 Static pressure coefficient $C_p$ on main wing. TEST CASE D.
H = 7 km ; M = 0.4 SUCTION SIDE

| $\xi \backslash \eta$ | .188 | .241 | .294 | .347 | .400 | .506 | .559 | .612 | .665 | .718 | .770 | .823 | .903 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| .05 | | | | | | | | | | | | | |
| .10 | | | | | | | | | | | | | |
| .15 | | | | -.600 | -.659 | -.707 | -.732 | -.760 | -1.509 | -.730 | -.313 | | .016 |
| .20 | .071 | -.542 | -.534 | -.564 | | | -.615 | -.670 | -1.032 | -.585 | -.580 | -.615 | -.630 |
| .25 | -.089 | -.500 | -.488 | -.506 | | | -.583 | -.631 | -.515 | -.546 | -.575 | | -.516 |
| .30 | -.002 | -.440 | -.453 | -.472 | | | -.510 | -.560 | -.575 | -.490 | -.475 | -.480 | -.432 |
| .35 | | -.405 | -.423 | -.441 | -.469 | -.494 | -.492 | -.509 | | | -.482 | -.494 | -.446 |
| .40 | | -.404 | -.410 | -.428 | | | -.445 | -.454 | -.448 | -.445 | -.454 | | -.405 |
| .45 | | | | | -.419 | -.439 | -.410 | | | -.414 | -.406 | | -.405 |
| .50 | -.735 | -.305 | -.302 | -.308 | -.364 | -.395 | -.388 | -.360 | -.340 | -.360 | -.338 | -.315 | -.400 |
| .55 | -.438 | -.336 | -.323 | -.316 | -.308 | -.316 | -.383 | -.310 | | | | -.275 | -.398 |
| .60 | -.407 | -.286 | -.280 | -.260 | -.267 | -.279 | -.265 | -.268 | -.290 | -.333 | | -.205 | -.337 |
| .65 | | | | | -.332 | -.326 | -.243 | | | | -.163 | -.150 | |
| .70 | -.318 | -.257 | -.206 | -.190 | | | -.168 | | | | -.112 | | |
| .75 | | | | | -.159 | -.138 | | | | | | | |
| .80 | | | | | -.097 | -.067 | | | | | | | |
| .85 | | | | | | | | | | | | | |
| .90 | .063 | -.036 | -.092 | -.056 | | | | | | | | | |
| .95 | | | | | | | | | | | | | |

$C_p$ ; H = 7 km ; M = 0.4 PRESSURE SIDE

| $\xi \backslash \eta$ | 0 | .241 | .294 | .347 | .453 | .506 | .559 | .612 | .665 | .744 | .770 | .850 | .903 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| .05 | | | | | | | | | | | | | |
| .10 | | | | | | | | | | | | | |
| .15 | | | | | .259 | | .265 | | | | .277 | | .162 |
| .20 | | .182 | | .255 | | | .280 | .310 | .204 | | | .255 | .170 |
| .25 | | .123 | | .160 | | | .199 | | | | .174 | | |
| .30 | | .126 | | .151 | | | .180 | | .168 | | .155 | .153 | .105 |
| .35 | -.387 | .059 | | .072 | | | .122 | | | | .104 | | |
| .40 | -.417 | .068 | | .081 | | | .115 | | .067 | | -.034 | | .063 |
| .45 | | | | | | | | | | | | | .025 |
| .50 | | .047 | | .005 | .155 | | .105 | .095 | -.077 | .095 | | .040 | .045 |
| .55 | | | | | | | .035 | | | | | .025 | |
| .60 | | | | | .029 | | .075 | .049 | | .026 | | | |
| .65 | | | | | -.072 | | | | | | | .050 | |
| .70 | | | | .316 | | .059 | .105 | | | | | | |
| .75 | | | | | | | | | | | | | |
| .80 | | | | | | | | | | | | | |
| .85 | | | | | | | | | | | | | |
| .90 | | | | | | | | | | | | | |
| .95 | | | | | | | | | | | | | |

Table IV.1 Static pressure coefficient $C_p$, leading edge.
Test case A. M= 0.89 H= 10 km

| | SPAN STATION | | | | | | |
|---|---|---|---|---|---|---|---|
| STATION | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| ORIFICE | | | | | | | |
| 18 | | -.086 | | | -.075 | | |
| 17 | | -.079 | | | -.024 | | |
| 16 | | -.066 | | | -.008 | | |
| 15 | | -.020 | | | .023 | | |
| 14 | | .025 | | | .043 | | |
| 1 | -.053 | .066 | .078 | .061 | .089 | .028 | .043 |
| 2 | .068 | .132 | .113 | .157 | .181 | .106 | .135 |
| 3 | .248 | .246 | .251 | .276 | .278 | .231 | .206 |
| 4 | .384 | .378 | .406 | .442 | .472 | .441 | .383 |
| 5 | .576 | .577 | .606 | .607 | .597 | .619 | .591 |
| 6 | .435 | .519 | .581 | .541 | .497 | .580 | .646 |
| 7 | -.245 | .130 | .198 | .154 | .116 | .303 | .442 |
| 8 | -.604 | -.381 | -.225 | -.235 | -.206 | .021 | .196 |
| 9 | -.468 | -.597 | -.398 | -.384 | -.385 | -.171 | .002 |
| 10 | -.594 | -.574 | -.426 | -.387 | -.409 | -.222 | -.076 |
| 11 | -.728 | -.645 | -.473 | -.379 | -.450 | -.240 | -.194 |
| 12 | -.693 | -.594 | -.436 | -.475 | -.429 | -.266 | -.274 |
| 13 | -.596 | -.526 | -.383 | -.430 | -.340 | -.359 | -.260 |

Table IV.1 Static pressure coefficient $C_p$, leading edge.
Test case B. M= 0.885 H= 7 km

| | SPAN STATION | | | | | | |
|---|---|---|---|---|---|---|---|
| STATION | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| ORIFICE | | | | | | | |
| 18 | | -.176 | | | -.160 | | |
| 17 | | -.171 | | | -.105 | | |
| 16 | | -.190 | | | -.083 | | |
| 15 | | -.104 | | | -.048 | | |
| 14 | | -.064 | | | -.037 | | |
| 1 | -.107 | -.027 | -.007 | -.023 | .010 | .002 | |
| 2 | -.026 | -.002 | .010 | .069 | .083 | .055 | |
| 3 | .155 | .112 | .139 | .177 | .181 | .115 | |
| 4 | .274 | .277 | .280 | .347 | .390 | .273 | .246 |
| 5 | .507 | .554 | .553 | .560 | .595 | .438 | |
| 6 | .479 | .570 | .626 | .585 | .575 | .463 | .494 |
| 7 | -.081 | .237 | .350 | .289 | .265 | .293 | |
| 8 | -.347 | -.126 | -.041 | -.051 | -.032 | .115 | |
| 9 | -.294 | -.299 | -.245 | -.212 | -.208 | -.037 | |
| 10 | -.451 | -.320 | -.255 | -.238 | -.182 | -.087 | |
| 11 | -.495 | -.378 | -.358 | -.271 | -.239 | -.116 | |
| 12 | -.467 | -.384 | -.343 | -.370 | -.302 | -.154 | |
| 13 | -.484 | -.426 | -.278 | -.250 | -.257 | -.248 | |

Table IV.1 Static pressure coefficient $C_p$, leading edge.
Test case C. M= 0.8 H= 7 km

| | SPAN STATION | | | | | | |
|---|---|---|---|---|---|---|---|
| STATION | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| ORIFICE | | | | | | | |
| 18 | | -.112 | | | -.175 | | |
| 17 | | -.094 | | | -.085 | | |
| 16 | | -.076 | | | -.062 | | |
| 15 | | -.027 | | | -.031 | | |
| 14 | | .016 | | | -.014 | | |
| 1 | -.071 | .065 | -.002 | .030 | .039 | .024 | .010 |
| 2 | .000 | .121 | .015 | .122 | .113 | .097 | .096 |
| 3 | .196 | .253 | .143 | .244 | .219 | .183 | .162 |
| 4 | .341 | .403 | .310 | .420 | .449 | .376 | .344 |
| 5 | .559 | .615 | .463 | .600 | .595 | .522 | .552 |
| 6 | .382 | .478 | .447 | .520 | .484 | .540 | .606 |
| 7 | -.367 | .006 | .121 | .096 | .089 | .258 | .397 |
| 8 | -.638 | -.413 | -.221 | -.302 | -.236 | -.016 | .143 |
| 9 | -.478 | -.562 | -.352 | -.440 | -.389 | -.204 | -.051 |
| 10 | -.604 | -.525 | -.319 | -.416 | -.398 | -.244 | -.127 |
| 11 | -.610 | -.523 | -.390 | -.422 | -.424 | -.272 | -.215 |
| 12 | -.582 | -.488 | -.332 | -.452 | -.427 | -.308 | -.273 |
| 13 | -.495 | -.411 | -.293 | -.392 | -.382 | -.378 | -.238 |

Table IV.1 Static pressure coefficient $C_p$, leading edge.
Test case D. M= 0.4 H= 7 km

| | SPAN STATION | | | | | | |
|---|---|---|---|---|---|---|---|
| STATION | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| ORIFICE | | | | | | | |
| 18 | | .270 | | | .243 | | |
| 17 | | .321 | | | .286 | | |
| 16 | | .350 | | | .323 | | |
| 15 | | .394 | | | .373 | | |
| 14 | | .452 | | | .432 | | |
| 1 | .398 | .518 | .528 | .497 | .490 | .462 | .335 |
| 2 | .528 | .590 | .625 | .591 | .585 | .560 | .425 |
| 3 | .612 | .620 | .744 | .631 | .627 | .614 | .485 |
| 4 | .528 | .394 | .751 | .363 | .384 | .462 | .371 |
| 5 | -.276 | -.678 | .216 | -.512 | -.608 | -.250 | -.113 |
| 6 | -2.764 | -2.829 | -1.145 | -2.467 | -2.026 | -1.522 | -1.010 |
| 7 | -4.365 | -4.527 | -2.662 | -4.107 | -3.288 | -2.594 | -1.927 |
| 8 | -3.086 | -4.403 | -3.161 | -3.949 | -3.193 | -2.708 | -2.034 |
| 9 | -1.914 | -2.836 | -2.729 | -2.625 | -2.421 | -2.140 | -1.445 |
| 10 | -1.562 | -2.121 | -1.800 | -1.963 | -1.870 | -1.606 | -1.174 |
| 11 | -1.256 | -1.699 | -1.510 | -1.490 | -1.501 | -1.405 | -1.013 |
| 12 | -1.041 | -1.334 | -1.153 | -1.277 | -1.228 | -1.132 | -.915 |
| 13 | -.819 | -.977 | -.915 | -1.064 | -.977 | -.916 | -.789 |

Table IV.2 Static pressure coefficient $C_p$, instrumented segment

TEST CASE

| | A | B | C | D |
|---|---|---|---|---|
| M | 0.89 | 0.885 | 0.8 | 0.4 |
| H | 10 | 7 | 7 | 7 |
| ORIFICE | | | | |
| 1 | .040 | -.051 | .017 | .488 |
| 2 | .125 | .030 | .101 | .568 |
| 3 | .214 | .110 | .188 | .616 |
| 4 | .286 | .183 | .259 | .600 |
| 5 | .364 | .266 | .342 | .496 |
| 6 | .436 | .329 | .409 | .344 |
| 7 | .523 | .447 | .510 | .016 |
| 8 | .593 | .544 | .589 | -.536 |
| 9 | .623 | .628 | .617 | -1.649 |
| 10 | .586 | .628 | .571 | -2.289 |
| 11 | .486 | .572 | .459 | -3.146 |
| 12 | .257 | .405 | .221 | -4.346 |
| 13 | .087 | .260 | .051 | -4.850 |
| 14 | -.130 | .067 | -.160 | -5.082 |
| 15 | -.319 | -.112 | -.346 | -4.682 |
| 16 | -.481 | -.260 | -.496 | -4.530 |
| 17 | -.533 | -.334 | -.550 | -3.226 |
| 18 | -.548 | -.362 | -.554 | -2.737 |
| 19 | -.583 | -.441 | -.552 | -2.441 |
| 20 | -.593 | -.362 | -.481 | -1.897 |
| 21 | -.541 | -.377 | -.493 | -1.593 |
| 22 | -.563 | -.421 | -.500 | -1.337 |
| 23 | -.463 | -.360 | -.443 | -1.129 |
| 24 | -.488 | -.377 | -.443 | -.993 |
| 25 | -.580 | -.500 | -.510 | -.904 |
| 26 | -.546 | -.461 | -.439 | -.744 |
| 27 | -.605 | -.446 | -.441 | -.664 |
| 28 | | | | |
| 29 | -.528 | -.498 | -.417 | -.536 |
| 30 | -.615 | -.579 | -.427 | -.512 |
| 31 | -.481 | -.421 | -.263 | -.344 |

Table IV.3 Static pressure coefficient $C_p$, aileron

TEST CASE

| | A | B | C | D |
|---|---|---|---|---|
| M | 0.89 | .885 | .80 | .400 |
| H | 10 | 7 | 7 | 7 |
| ORIFICE | | | | |
| 401 | -.049 | -.066 | -.084 | .032 |
| 402 | .074 | .071 | .036 | .097 |
| 404 | .194 | .191 | .162 | .129 |
| 406 | .138 | .141 | .102 | .089 |
| 407 | .084 | .081 | .022 | .024 |
| 408 | .037 | .026 | -.016 | -.016 |
| 409 | -.002 | -.023 | -.076 | -.081 |
| 410 | -.047 | -.050 | -.090 | -.089 |
| | | | | |
| 901 | -.072 | -.079 | -.102 | .008 |
| 902 | .119 | .126 | .090 | .097 |
| 903 | .169 | .174 | .144 | .121 |
| 904 | .201 | .199 | .178 | .145 |
| 905 | .186 | .184 | .154 | .113 |
| 906 | .117 | .120 | .082 | .032 |
| 907 | .062 | .066 | .026 | -.016 |
| 908 | -.060 | -.055 | -.102 | -.137 |

Table IV.4 Static pressure coefficient $C_p$, wing tip.

TEST CASE

| | A | B | C | D | | A | B | C | D |
|---|---|---|---|---|---|---|---|---|---|
| M | 0.89 | .885 | .80 | .40 | M | 0.89 | 0.885 | 0.80 | 0.40 |
| H | 10 | 7 | 7 | 7 | H | 10 | 7 | 7 | 7 |
| ORIFICE | | | | | ORIFICE | | | | |
| 1 | -.479 | -.385 | -.327 | -1.047 | 36 | -.294 | -.248 | -.278 | -.592 |
| 2 | -.371 | -.170 | -.122 | -2.266 | 37 | -.354 | -.255 | -.292 | -1.241 |
| 3 | -.024 | -.047 | .016 | -.300 | 38 | -.568 | -.325 | -.391 | -1.873 |
| 4 | -.043 | -.091 | -.043 | .160 | 39 | -.346 | -.194 | -.250 | -1.977 |
| 5 | -.627 | -.443 | -.300 | -.677 | 40 | -.154 | -.093 | -.120 | -1.369 |
| 6 | -.458 | -.497 | -.332 | -.830 | 41 | | -.126 | -.133 | -.796 |
| 7 | -.126 | -.155 | -.117 | .083 | 42 | | -.103 | -.102 | -.337 |
| 8 | -.136 | -.169 | -.130 | .121 | 43 | | -.104 | -.102 | -.115 |
| 9 | -.521 | -.446 | -.311 | -.632 | 44 | | -.139 | -.129 | -.023 |
| 10 | -.517 | -.443 | -.303 | -.575 | 45 | | -.146 | -.133 | -.008 |
| 11 | -.272 | -.437 | -.352 | -.638 | 46 | -.158 | -.184 | -.162 | -.006 |
| 12 | -.166 | -.201 | -.151 | .045 | 47 | -.189 | -.215 | -.203 | -.032 |
| 13 | -.168 | -.200 | -.152 | .070 | 48 | -.172 | -.156 | -.240 | -.326 |
| 14 | -.339 | -.311 | -.299 | -.518 | 49 | -.203 | -.182 | -.246 | -.370 |
| 15 | -.279 | -.320 | -.304 | -.547 | 50 | -.280 | -.166 | -.249 | -1.768 |
| 16 | -.415 | -.326 | -.306 | -.683 | 51 | -.152 | -.157 | -.162 | -.070 |
| 17 | -.377 | -.330 | -.305 | -.795 | 52 | -.144 | -.157 | -.165 | -.019 |
| 18 | -.477 | -.350 | -.310 | -1.130 | 53 | -.067 | -.052 | -.092 | -.217 |
| 19 | -.525 | -.346 | -.339 | -1.542 | 54 | -.071 | -.052 | -.094 | -.249 |
| 20 | -.475 | -.258 | -.252 | -1.689 | 55 | -.280 | -.152 | -.235 | -1.807 |
| 21 | -.327 | -.204 | -.198 | -1.366 | 56 | -.063 | -.061 | -.084 | -.045 |
| 22 | -.223 | -.151 | -.146 | -1.083 | 57 | - 075 | -.079 | -.100 | -.026 |
| 23 | -.166 | -.155 | -.150 | -.830 | 58 | -.274 | -.101 | -.197 | -1.500 |
| 24 | -.102 | -.118 | -.113 | -.453 | 59 | -.286 | -.064 | -.162 | -1.226 |
| 25 | -.084 | -.109 | -.104 | -.306 | | | | | |
| 26 | -.106 | -.145 | -.140 | | | | | | |
| 27 | -.118 | -.166 | -.170 | | | | | | |
| 28 | -.094 | -.140 | -.134 | | | | | | |
| 29 | -.098 | -.147 | -.142 | | | | | | |
| 30 | -.120 | -.177 | -.166 | | | | | | |
| 31 | -.134 | -.183 | -.167 | | | | | | |
| 32 | -.176 | -.216 | -.190 | | | | | | |

Table IV.5 Static pressure coefficient $C_p$, fuselage.

| | Test case | | | |
|---|---|---|---|---|
| | A | B | C | D |
| M | .89 | .885 | .80 | .40 |
| H | 10 | 7 | 7 | 7 |
| ORIFICE | | | | |
| 1 | -.020 | | -.037 | .070 |
| 2 | -.087 | | -.097 | -.012 |
| 3 | -.124 | | -.131 | -.111 |
| 4 | -.123 | | -.132 | -.194 |
| 5 | -.075 | | -.088 | -.272 |
| 6 | .088 | | .052 | -.640 |
| 7 | .193 | | .154 | -.611 |
| 8 | .254 | | .211 | -.714 |
| 9 | -.081 | | -.091 | -.062 |
| 10 | -.112 | -.110 | -.119 | -.133 |
| 11 | -.153 | -.121 | -.160 | -.152 |
| 12 | -.157 | -.151 | -.167 | -.141 |
| 13 | -.091 | -.062 | -.098 | -.129 |
| 14 | .147 | .116 | .117 | -.011 |
| 15 | .320 | .257 | .311 | .175 |
| 16 | .054 | .039 | .024 | -.049 |
| 17 | .230 | .172 | .196 | .042 |
| 18 | .314 | .255 | .312 | .220 |
| 19 | -.151 | -.132 | -.160 | -.087 |
| 20 | -.188 | -.158 | -.192 | -.091 |
| 21 | -.023 | | -.043 | -.067 |
| 22 | -.019 | | -.039 | -.055 |
| 23 | .043 | | .017 | -.028 |
| 24 | .011 | | -.013 | -.039 |
| 25 | -.101 | | -.099 | -.087 |
| 26 | -.105 | | -.114 | -.142 |
| 27 | -.160 | | -.164 | -.165 |
| 28 | -.186 | | -.189 | -.188 |
| 29 | -.085 | -.069 | -.089 | -.133 |
| 30 | .151 | | .115 | -.039 |
| 31 | .326 | | .310 | .161 |

Table IV.6 Static pressure coefficient $C_p$, stabilizer, leading edge. Station 11.

| | Test case A | B | C | D |
|---|---|---|---|---|
| M | 0.89 | 0.885 | 0.80 | 0.40 |
| H | 10 | 7 | 7 | 7 |
| ORIFICE | | | | |
| 1 | -.372 | -.396 | -.321 | -.051 |
| 2 | -.334 | -.351 | -.305 | .051 |
| 3 | -.369 | -.399 | -.349 | .055 |
| 4 | -.440 | -.603 | -.429 | .150 |
| 5 | -.099 | -.123 | -.123 | .080 |
| 6 | .487 | .419 | .45 | .464 |
| 7 | .583 | .555 | .563 | .164 |
| 8 | .528 | .527 | .514 | -.022 |
| 9 | .393 | .409 | .387 | -.201 |
| 10 | .314 | .340 | .307 | -.271 |
| 11 | .151 | .174 | .146 | -.263 |
| 12 | .033 | .051 | .030 | -.245 |

Table IV.6 Static pressure coefficient $C_p$, stabilizer, leading edge. Station 12.

| | Test case A | B | C | D |
|---|---|---|---|---|
| M | 0.89 | 0.885 | 0.80 | 0.40 |
| H | 10 | 7 | 7 | 7 |
| ORIFICE | | | | |
| 1 | -.224 | -.258 | -.218 | -.093 |
| 2 | -.443 | -.440 | -.383 | |
| 3 | -.336 | -.385 | -.359 | -.063 |
| 4 | -.483 | -.505 | -.438 | -.011 |
| 5 | -.561 | -.670 | -.480 | .030 |
| 6 | -.554 | -.654 | -.523 | .108 |
| 7 | -.365 | -.459 | -.383 | .273 |
| 8 | .049 | -.038 | .028 | .542 |
| 9 | .433 | .369 | .416 | .583 |
| 10 | .552 | .519 | .534 | .441 |
| 11 | .573 | .572 | .552 | .250 |
| 12 | .490 | .511 | .457 | .056 |
| 13 | .391 | .421 | .361 | -.049 |
| 14 | .290 | .328 | .259 | -.112 |
| 15 | .219 | .261 | .187 | -.142 |
| 16 | .166 | .209 | .133 | -.149 |
| 17 | .128 | .169 | .093 | -.157 |
| 18 | .098 | .134 | .064 | -.164 |
| 19 | -.026 | .011 | -.057 | -.183 |
| 20 | -.070 | -.035 | -.087 | |
| 21 | -.136 | -.104 | -.134 | -.190 |

Table IV.6 Static pressure coefficient $C_p$, stabilizer, leading edge. Station 13.

| | Test case | | | |
|---|---|---|---|---|
| | A | B | C | D |
| M | 0.89 | 0.885 | 0.80 | 0.40 |
| H | 10 | 7 | 7 | 7 |
| ORIFICE | | | | |
| 2 | -.489 | -.485 | -.409 | |
| 3 | -.462 | -.606 | -.542 | |
| 4 | -.448 | -.486 | -.520 | |
| 5 | .447 | .426 | .402 | |
| 6 | .592 | .573 | .550 | |
| 7 | .624 | .630 | .587 | |
| 8 | .553 | .550 | .491 | |
| 9 | .437 | .462 | .405 | |
| 10 | .298 | .330 | .264 | |
| 11 | .066 | .093 | .028 | |
| 12 | -.050 | -.026 | -.090 | |

Table IV.7 Static pressure coefficient $C_p$, stabilizer tip.

| | TEST CASE | | | |
|---|---|---|---|---|
| | A | B | C | D |
| M | 0.89 | .885 | .80 | .40 |
| H | 10 | 7 | 7 | 7 |
| ORIFICE | | | | |
| 1 | .216 | .214 | .280 | .239 |
| 2 | -.120 | -.137 | -.014 | -.060 |
| 3 | -.085 | -.101 | -.032 | -.024 |
| 4 | -.107 | -.122 | -.057 | -.088 |
| 5 | -.115 | -.121 | -.076 | -.120 |
| 6 | -.075 | -.076 | -.049 | -.108 |
| 7 | -.086 | -.086 | -.063 | -.124 |
| 8 | -.056 | -.055 | -.039 | -.124 |
| 9 | -.022 | -.015 | -.009 | -.132 |
| 10 | .006 | .013 | .014 | -.132 |
| 11 | .043 | .049 | .046 | -.148 |
| 12 | -.389 | -.383 | -.272 | -.032 |
| 13 | | | | |
| 14 | | | | |
| 15 | | | | |
| 16 | -.208 | -.195 | -.209 | -.125 |
| 17 | | | | |
| 18 | -.184 | -.175 | -.171 | -.048 |
| 19 | | | | |
| 20 | -.196 | -.180 | -.152 | -.055 |
| 21 | -.169 | -.151 | -.109 | -.151 |
| 22 | -.117 | -.102 | -.060 | -.321 |
| 23 | -.090 | -.090 | -.081 | -.569 |
| 24 | -.056 | -.059 | -.067 | -.588 |
| 25 | -.050 | -.056 | -.076 | -.510 |
| 26 | | | | |
| 27 | -.104 | -.111 | -.139 | -.403 |
| 28 | | | | |
| 29 | -.166 | -.168 | -.188 | -.369 |

Table V. Local skin friction coefficient $C_f$ on main wing. TEST CASE A.
$C_f \times 10^5$ ; H= 10 km ; M= 0.89 SUCTION SIDE

| $\xi \backslash \eta$ | .188 | .241 | .294 | .347 | .400 | .506 | .559 | .612 | .665 | .718 | .770 | .823 | .903 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| .05 | | | | | | | | | | | | | |
| .10 | | | | | | | | | | | | | |
| .15 | | | | | 224 | 225 | 247 | 220 | 252 | 257 | 178 | 72 | 372 |
| .20 | | | | | | | | | | | | | |
| .25 | 153 | 98 | 130 | 192 | 187 | 153 | | | 182 | | 312 | | 237 |
| .30 | 141 | 137 | 147 | 210 | | | | | 171 | 208 | | | |
| .35 | | 156 | 221 | 215 | | | 169 | 190 | | | | | |
| .40 | 130 | 153 | 201 | 203 | | | 216 | 171 | 222 | 242 | 213 | | 88 |
| .45 | | | | | | | | | | 241 | 211 | | 221 |
| .50 | 314 | 288 | 148 | 187 | | | | | | | 215 | 18 | 220 |
| .55 | 111 | 120 | 156 | 207 | | | 119 | 72 | | 162 | | | 218 |
| .60 | | | | | 217 | 166 | | | 226 | 263 | | 120 | |
| .65 | 165 | 188 | 201 | 176 | 212 | 158 | 73 | 73 | | 198 | | | 325 |
| .70 | 156 | 137 | 198 | 175 | | 103 | 138 | | | | | | |
| .75 | 109 | 106 | 137 | 132 | 210 | 137 | 106 | | | | | | |
| .80 | 116 | 124 | 156 | 135 | | | | | | | | | |
| .85 | | | | | 194 | 86 | | | | | | | |
| .90 | | | | | | | | | | | | | |
| .95 | | | | | | | | | | | | | |

$C_f \times 10^5$; H= 10 km ; M= 0.89 PRESSURE SIDE

| $\xi \backslash \eta$ | 0 | .241 | .347 | .453 | .559 | .612 | .665 | .744 | .770 | .903 |
|---|---|---|---|---|---|---|---|---|---|---|
| .05 | | | | | | | | | | |
| .10 | | | | | | | | | | |
| .15 | | | | 173 | 307 | | | | 209 | 198 |
| .20 | | | | | | | 292 | | | |
| .25 | | 152 | 236 | | | | | | 261 | 194 |
| .30 | | 148 | 239 | | | | | 255 | | |
| .35 | 181 | 208 | 239 | | 177 | | | | 212 | |
| .40 | 192 | 224 | 228 | | | | 219 | | 206 | 224 |
| .45 | | | | | 185 | | | | 182 | |
| .50 | | 155 | 189 | | 201 | | 201 | | | |
| .55 | | | | | | | | | | |
| .60 | | | | 157 | | 162 | 169 | 178 | | |
| .65 | | | | 159 | 172 | | | | | |
| .70 | | | | 114 | | | | | | |
| .75 | | | | | | | | | | |
| .80 | | | | | | | | | | |
| .85 | | | | | | | | | | |
| .90 | | | | | | | | | | |
| .95 | | | | | | | | | | |

Table V. Local skin friction coefficient $C_f$ on main wing. TEST CASE B.
$C_f \times 10^5$ ; H= 7 km ; M= 0.885 SUCTION SIDE

| ξ \ η | .188 | .241 | .294 | .347 | .400 | .506 | .559 | .612 | .665 | .718 | .770 | .823 | .903 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| .05 | | | | | | | | | | | | | |
| .10 | | | | | | | | | | | | | |
| .15 | | | | | 202 | 212 | 231 | 221 | 274 | 258 | 201 | 83 | 455 |
| .20 | 115 | 118 | 143 | 218 | | | | 242 | | 251 | | | 237 |
| .25 | 143 | 127 | 190 | 208 | | | | | 208 | | 294 | 108 | |
| .30 | | | | | 190 | 159 | 212 | 181 | | | 244 | 219 | 139 |
| .35 | | 185 | 208 | 203 | | | 158 | 192 | | | | | |
| .40 | | 165 | 200 | 208 | | | | 175 | 226 | 246 | 219 | | |
| .45 | | | | | | | | | | 236 | 212 | | 219 |
| .50 | 334 | 269 | 199 | 214 | | | | | | | 190 | | 216 |
| .55 | 111 | 115 | 140 | 198 | | | 101 | 168 | | 198 | | | 218 |
| .60 | | | | | 201 | 177 | | 91 | 208 | 256 | | | |
| .65 | 145 | 187 | 174 | 177 | 205 | 165 | 107 | 129 | | 206 | | | 221 |
| .70 | 150 | 130 | 176 | 173 | | 118 | 119 | | | | | | |
| .75 | 126 | 141 | 159 | 145 | 244 | 119 | 129 | | | | | | |
| .80 | 99 | 115 | 177 | 127 | | | | | | | | | |
| .85 | | | | | 213 | 108 | | | | | | | |
| .90 | 129 | 159 | 110 | 125 | | | | | | | | | |
| .95 | | | | | | | | | | | | | |

$C_f$ ; H = 7 km ; M = 0.885 PRESSURE SIDE

| ξ \ η | 0 | .241 | .347 | .453 | .559 | .612 | .665 | .744 | .770 | .903 |
|---|---|---|---|---|---|---|---|---|---|---|
| .05 | | | | | | | | | | |
| .10 | | | | | | | | | | |
| .15 | | | | 175 | 270 | | | | 239 | 173 |
| .20 | | 120 | 250 | | | | 265 | 277 | | 298 |
| .25 | | 134 | 237 | | | | | | 235 | 184 |
| .30 | | | | 185 | 234 | 242 | | | | 228 |
| .35 | 227 | 200 | 231 | | 173 | | | | 206 | |
| .40 | 192 | 219 | 222 | | 221 | | 215 | | 191 | |
| .45 | | | | | 174 | | | | 179 | |
| .50 | | 182 | 215 | | | | 204 | | | |
| .55 | | | | | | | | | | |
| .60 | | | | 155 | | 147 | 169 | 155 | | |
| .65 | | | | 165 | 167 | | | | | |
| .70 | | | | 117 | | | | | | |
| .75 | | | | | | | | | | |
| .80 | | | | | | | | | | |
| .85 | | | | | | | | | | |
| .90 | | | | | | | | | | |
| .95 | | | | | | | | | | |

Table VI. Boundary layer pressures measured with rake. $\eta$= 0.82. The tubes have 1.6 mm diameter and the rake was aligned in the x-direction. $C_p$-values are wall pressures.

TEST CASE A
M= 0.89 H= 10 km

| $\xi$ = | .20 | .30 | .40 | .50 | .60 |
|---|---|---|---|---|---|
| $C_p$ | -.675 | -.610 | -.575 | -.225 | -.150 |
| TUBE | | | | | |
| 1 | .155 | .042 | -.066 | -.172 | .025 |
| 2 | .193 | .092 | -.037 | -.107 | -.005 |
| 3 | .430 | .266 | .112 | -.042 | .020 |
| 4 | .824 | .535 | .351 | .179 | .052 |
| 5 | 1.208 | .973 | .701 | .468 | .162 |
| 6 | 1.229 | 1.231 | 1.034 | .782 | .347 |
| 7 | 1.234 | 1.249 | 1.202 | 1.081 | .610 |
| 8 | 1.236 | 1.246 | 1.207 | 1.206 | 1.160 |
| 9 | 1.231 | 1.244 | 1.205 | 1.198 | 1.219 |
| 10 | 1.201 | 1.231 | 1.190 | 1.136 | 1.217 |

TEST CASE B
M= 0.885 H= 7 km

| $\xi$ = | .20 | .30 | .40 | .50 | .60 |
|---|---|---|---|---|---|
| $C_p$ | -.450 | -.535 | -.643 | -.250 | -.195 |
| TUBE | | | | | |
| 1 | .244 | .157 | .062 | -.054 | .025 |
| 2 | .324 | .195 | .095 | -.053 | .073 |
| 3 | .510 | .372 | .202 | .014 | .119 |
| 4 | .921 | .660 | .446 | .182 | .192 |
| 5 | 1.165 | 1.040 | .787 | .463 | .384 |
| 6 | 1.164 | 1.213 | 1.071 | .843 | .533 |
| 7 | 1.160 | 1.220 | 1.182 | 1.138 | .837 |
| 8 | 1.160 | 1.218 | 1.185 | 1.218 | 1.194 |
| 9 | 1.157 | 1.215 | 1.184 | 1.215 | 1.192 |
| 10 | 1.152 | 1.210 | 1.176 | 1.197 | 1.181 |

TEST CASE C.
M= 0.8 H= 7 km

| $\xi$ = | .20 | .30 | .40 | .50 | .60 |
|---|---|---|---|---|---|
| $C_p$ | -.415 | -.395 | -.365 | | -.225 |
| TUBE | | | | | |
| 1 | .254 | .215 | .199 | | .210 |
| 2 | .316 | .254 | .254 | | .256 |
| 3 | .488 | .380 | .359 | | .328 |
| 4 | .877 | .642 | .566 | | .460 |
| 5 | 1.161 | 1.008 | .826 | | .617 |
| 6 | 1.165 | 1.168 | 1.039 | | .807 |
| 7 | 1.167 | 1.178 | 1.156 | | 1.009 |
| 8 | 1.167 | 1.176 | 1.160 | | 1.175 |
| 9 | 1.167 | 1.174 | 1.160 | | 1.177 |
| 10 | 1.165 | 1.182 | 1.160 | | 1.175 |

TEST CASE D
M= 0.4 H= 7 km

| $\xi$ = | .20 | .30 | .40 | .50 | .60 |
|---|---|---|---|---|---|
| $C_p$ | -.600 | -.460 | -.370 | -.315 | |
| TUBE | | | | | |
| 1 | -.038 | .008 | .061 | .163 | |
| 2 | -.031 | .079 | .107 | .264 | |
| 3 | .107 | .142 | .168 | .365 | |
| 4 | .337 | .244 | .275 | .497 | |
| 5 | .658 | .457 | .444 | .412 | |
| 6 | .934 | .583 | .566 | .552 | |
| 7 | 1.072 | .844 | .727 | .668 | |
| 8 | 1.080 | 1.064 | .994 | .878 | |
| 9 | 1.064 | 1.064 | 1.048 | 1.057 | |
| 10 | 1.064 | 1.064 | 1.048 | 1.064 | |

| TUBE | WALL DISTANCE [m] |
|---|---|
| 1 | .0008 |
| 2 | .0013 |
| 3 | .0022 |
| 4 | .0037 |
| 5 | .0060 |
| 6 | .0085 |
| 7 | .0115 |
| 8 | .0170 |
| 9 | .0230 |
| 10 | .0350 |

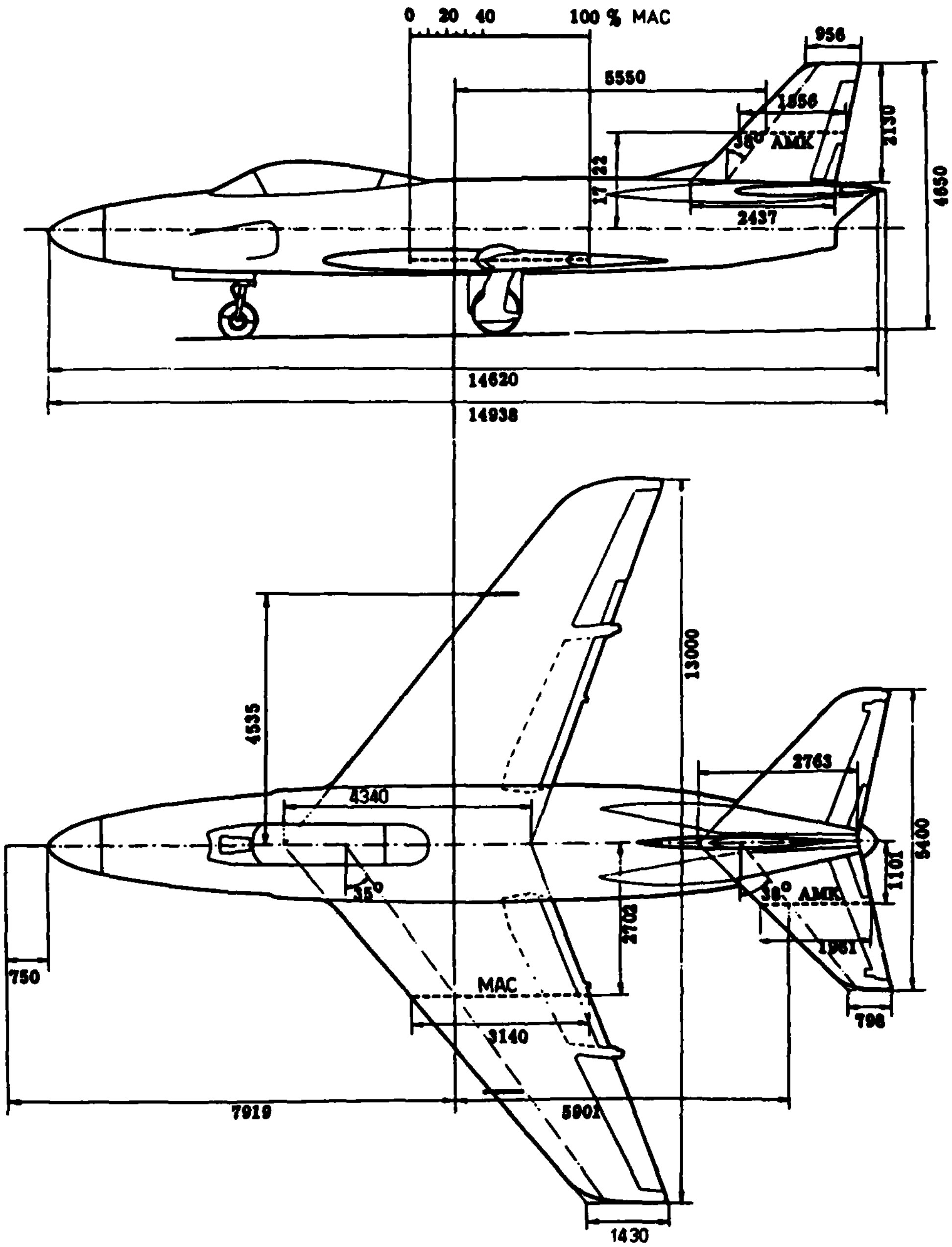



Fig. 1 Aircraft: SAAB A32A Lansen.
Main dimensions and angles.

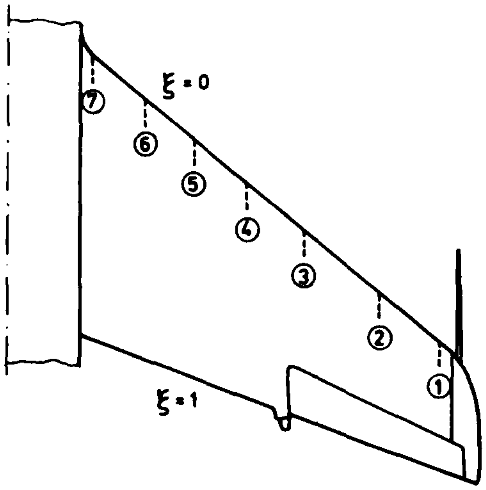



Fig. 2 Measurement stations in nose region. (1 → 7)

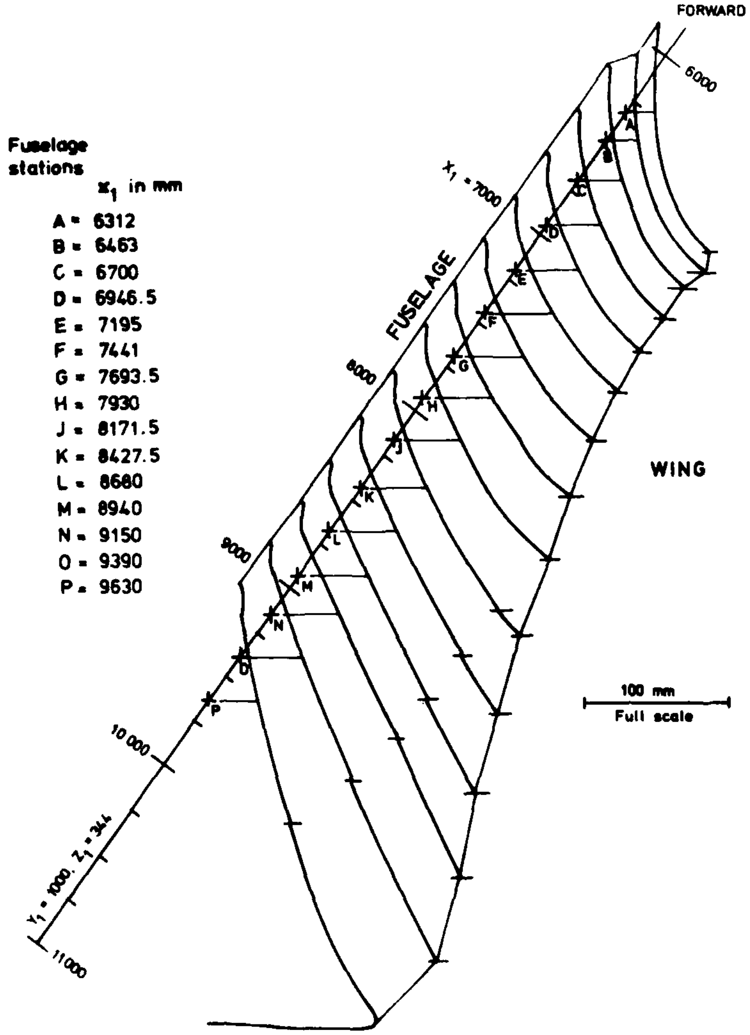



Fig. 3 Fillet data. Shape traced at stations A - P relative to line parallel with body axis. ( $Y_1$=1000, $Z_1$=344 )

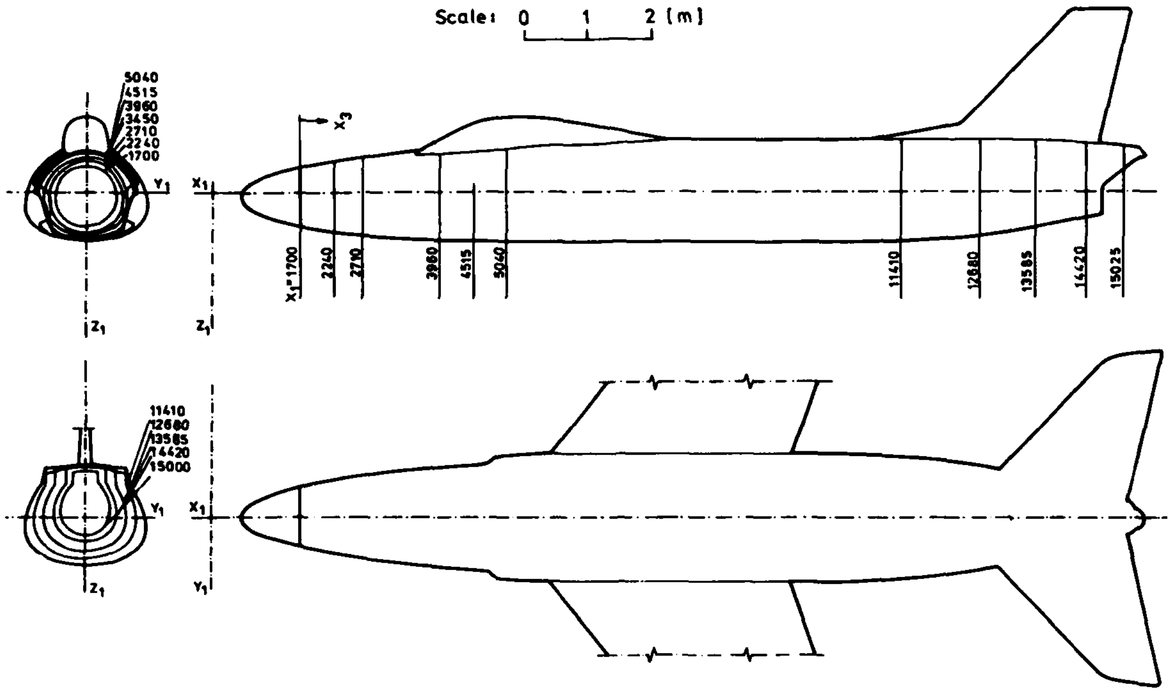



Fig. 4 Fuselage shape with cross-sectional cuts at selected stations. ( $X_1$ values [mm] may be used for improved scale ).

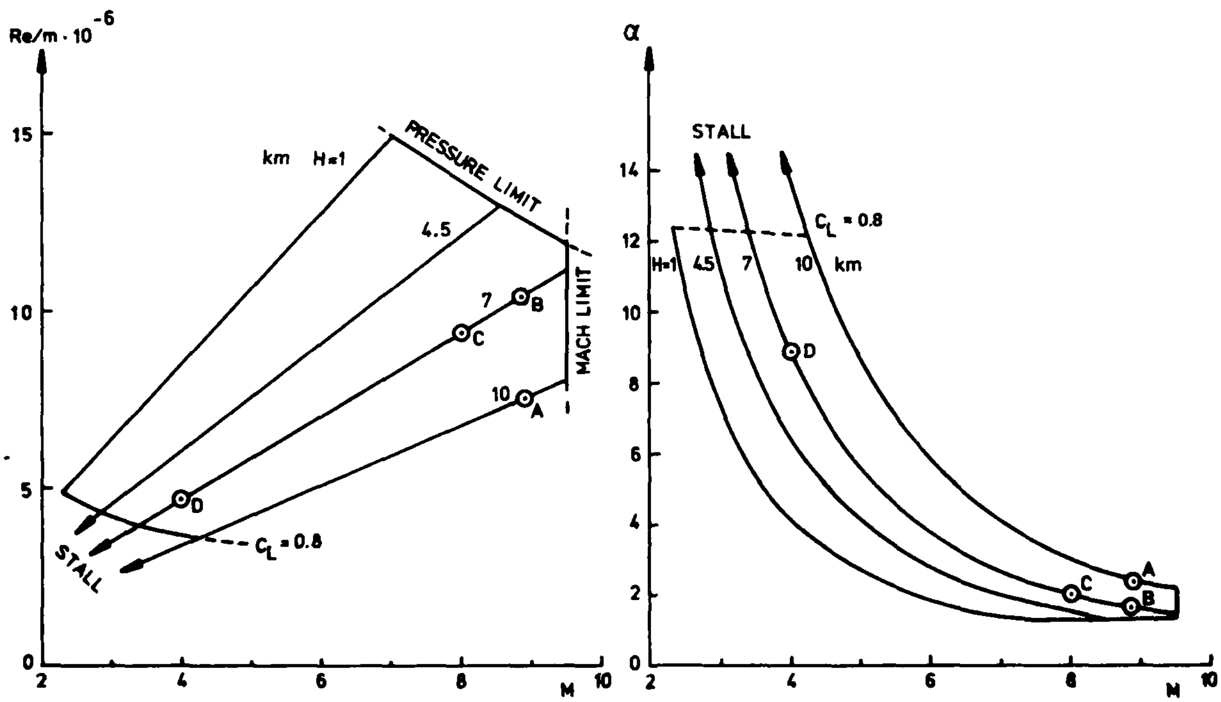



Fig. 5 Flight envelope; Re/m or α versus Mach number for various altitudes. Test cases A – D indicated.

| REPORT DOCUMENTATION PAGE | | | |
|---|---|---|---|
| 1. Recipient's Reference | 2. Originator's Reference<br>AGARD-AR-138<br>Addendum | 3. Further Reference<br><br>ISBN 92-835-1475-0 | 4. Security Classification of Document<br>UNCLASSIFIED |
| 5. Originator | Advisory Group for Aerospace Research and Development<br>North Atlantic Treaty Organization<br>7 rue Ancelle, 92200 Neuilly sur Seine, France | | |
| 6. Title | EXPERIMENTAL DATA BASE FOR COMPUTERS: PROGRAM ASSESSMENT | | |
| 7. Presented at | | | |
| 8. Author(s)/Editor(s) | Various | | 9. Date<br>July 1984 |
| 10. Author's/Editor's Address | Various | | 11. Pages<br>148 |
| 12. Distribution Statement | This document is distributed in accordance with AGARD policies and regulations, which are outlined on the Outside Back Covers of all AGARD publications. | | |
| 13. Keywords/Descriptors | Computer programs<br>Aerodynamic characteristics<br>Assessments | Mathematical models<br>Data processing<br>Aerodynamic configurations | |

14. Abstract


The data collected in this Addendum complement those included in the AGARD Advisory Report No. AR-138 issued in May 1979. In that report certain recommendations were made with regard to further, more rigorous, test cases. At the time the AGARD Fluid Dynamics Panel instructed the TES (Technique d'Essais en Soufflerie) committee to pay heed to those recommendations and take action, when a suitable experimental data base became available. A number of 3-D test cases that closely match these recommendations have since then appeared and the TES committee has felt obliged to follow up on its own recommendations and make these data available to the AGARD community.

Regarding further 2-D test cases, no test has as yet appeared that matches the recommendations for the "ideal" test case given in AR-138. However, considerable effort is still being expended in many NATO countries towards the perfection of the 2-D test methodology (e.g. US., Canada and the Garteur group in Europe). The TES-committee will stay à jour with these developments and, if and when warranted, follow up with appropriate action.

Concerning body-alone configurations, it was recommended in AR-138 that the data given for the ONERA calibration body C5 (case C4 in AR-138) should be complemented with boundary layer survey data. This would result in virtually the ideal test case for bodies of revolution at zero angle of attack. However no such data have so far been produced.

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Concerning body-alone configurations, it was recommended in AR-138 that the data given for the ONERA calibration body C5 (case C4 in AR-138) should be complemented with boundary layer survey data. This would result in virtually the ideal test case for bodies of revolution at zero angle of attack. However no such data have so far been produced.

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